ANNUAL REPORT
OF
PROGRAM ACTIVITIES
NATIONAL INSTITUTES OF HEALTH

1961

CLINICAL CENTER
DIVISION OF BIOLOGICS STANDARDS
DIVISION OF GENERAL MEDICAL SCIENCES
DIVISION OF RESEARCH GRANTS
DIVISION OF RESEARCH SERVICES

NATIONAL INSTITUTES OF HEALTH
PUBLIC HEALTH SERVICE
U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Calendar Year 1961

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SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

OFFICE OF THE DIRECTOR CC-01
Serial No.

The Clinical Center is a combined laboratory and research hospital whose primary mission is to provide the specialized forms of hospital care necessary for the study of both normal and abnormal physical and emotional phenomena in patients, thereby furthering the never-ending quest for new knowledge of the diseases of man. The complexities of modern medical and related sciences have created many narrowly limited specialties. The system of daily operation at the Clinical Center integrates the various problems of these specialties and, in so doing, hastens the acquisition and evaluation of knowledge. This gives material aid in checking the mounting problem of chronic diseases and those with the highest incidence of morbidity and mortality.

Except for physician care, which is furnished by the categorical Institutes, the Office of the Director is responsible for all aspects of patient care, including admission, diagnosis, treatment, nursing and dietetic care, laboratory procedures, social service, diagnostic X-ray, pharmacy service, medical records, chaplaincy service, rehabilitation, and environmental sanitation. Control is exercised by a continuing evaluation of all hospital departments and services. Patient care is optimum in quality and patients are the most important persons in the Clinical Center. Over and above affording them professional care of high standards, they are respected as persons and all personnel concerned with them strive, with true warmth and genuine interest, to make them happy and comfortable.

That the Clinical Center is more than a hospital is illustrated by the way its patients are admitted. Each patient is carefully selected for a specific current research project. They are accepted from all parts of the United States and a few come from abroad. They must be referred by their individual physicians or by other qualified medical sources familiar with the patient's medical history and current condition. Upon discharge, the patient's referring physician is sent a full report of findings and, where indicated, recommendations which may be helpful in his further management of the patient's illness.

New Surgical Wing

Due to unforeseen delay on the part of the contractor, dedication of the new Surgical Wing of the Clinical Center has been delayed. This circular 4-story annex has been designed to provide the most modern facilities for programs of clinical investigation in cardiac and neurological surgery. Unique of its kind, it offers special features of electronic monitoring of physiologic

functions during surgery and of utilization of television and photography for the purpose of recording and transmitting surgical procedures.

Normal Volunteer Program

The Normal Volunteer Program continues to be expanded and the age spectrum of volunteers has been appreciably increased, thereby affording a greater scope to our clinical research. Special mention is made of the excellent cooperation of the U. S. Bureau of Prisons in providing healthy male prisoners as volunteer normal control patients for studies on upper respiratory infections. The Normal Volunteers are one of our most precious resources. This program is based on the most meticulous screening of projects because the safety and well being of all patients, including normal controls, are of vital concern.

In seeking approval for a research proposal for volunteers, the investigator must first prepare a written description of the project in which he presents the purpose of the research; procedures to be followed; anticipated duration of the study; what will be required of the volunteers; nature and extent of inconveniences and risk involved, and all related pertinent information. Clearances of the proposal are required from the Clinical Director of the Institute concerned; Clinical Research Committee of the Medical Board of the Clinical Center; Medical Board of the Clinical Center; and the Director, NIH.

Projects are approved only for the duration of the principal investigator's association with and direction of the specific project. Only qualified physicians and dentists who are NIH staff members may assume responsibility for clinical diagnosis, investigation and care. The principal investigator is personally responsible for providing assigned volunteers, at the level of their individual comprehension, with sufficient information about the purpose, methods, demands, risks, inconveniences and discomforts of the study to enable each volunteer to make a mature judgment as to his willingness and ability to participate. He is also responsible for obtaining the signed consent of each volunteer to participate in each phase of the research project. The average volunteer patient participates in a number of diversified research projects. Some of the long-term volunteers have taken part in as many as 12 and 14 individual research projects.

Admission and Occupancy Data

During fiscal year 1961 the 516 beds of the Clinical Center were used to their planned percentage of capacity for the fourth successive year. The 3,863 patients admitted was an increase of 308 patients over the preceding year. The average daily census was 387, an average daily occupancy rate of 75 per cent. The total number of patients admitted since the Clinical Center opened in 1953 was 21,408. The number of Followup patients seen in fiscal year 1961 was 27,416, an increase of 3.8 per cent over fiscal year 1960. Each year the flow of referrals from practicing physicians has been very gratifying. All referrals are formally reviewed and those meeting the specific requirements of a current clinical study are admitted when there is a bed vacant.

Information concerning the varying needs of the programs of clinical investigation is presented in brochure form twice each year as PHS Publication No. 284, "Current Clinical Studies and Patient Referral Procedures." It is distributed to a mailing list of over 8,200 interested physicians. This is supplemented by special announcements to medical journals, professional "newspapers," and the lay press when there is a pressing need for a new type of clinical material between editions of the brochure.

A better understanding of the mission and purpose of the Clinical Center is being effected by our contacts with national, regional and local medical and paramedical societies, especially with regard to the study and treatment of the patients we accept. In obtaining patients for study, close collaboration is maintained with physicians, hospitals, medical schools and clinics - the purpose being not to interfere or compete, but rather to permit medical practice, teaching and research to proceed together in harmony. By referring patients, physicians and institutions actively participate in medical research through consultation, followup treatment and observation. To facilitate the long-term followup treatments and observations so essential to many of the research study projects, 46 per cent of the patients admitted in fiscal year 1961 were from Maryland, Virginia and the District of Columbia.

Advanced Training of Physicians

In carrying on the integrated laboratory-clinical research programs, the Clinical Center maintains an environment conducive to productive medical research in which advanced training opportunities are afforded to promising young physicians to qualify them for medical research careers. Their professional growth is important to the Clinical Center program. They come to us from universities in which there are extensive research programs in the biological sciences. In all duty assignments given to them, there is a strong educational phase consisting of work assignments within a research area. Their professional growth develops through the process of intimate personal guidance by senior workers, coupled with selected educational experiences designed to advance both the work in progress and the competence of the young investigator. This system has the advantage of providing the highest possible quality of care for patients while increasing the number of physicians trained in the methodology of research.

They are divided into three groups: Clinical Fellows, Clinical Associates, and Research Associates. The Clinical Fellows are appointed to those Institutes and professional departments where residency training has been developed. American Medical Specialty Board credits are available in clinical pathology, pathologic anatomy, radiology, internal medicine, psychiatry, neurology, dermatology, oral pathology, and ophthalmology. In addition to their research studies, the Clinical Associates help to provide the medical attention research patients must have. Their clinical responsibilities are similar to those of the Residents. The Research Associates devote their time entirely to laboratory studies. After two or three years most of these young physicians leave to pursue their careers elsewhere, which for a large proportion is in medical research or teaching.

At the end of fiscal year 1961, 67 physicians completed their training; 13 were Clinical Fellows, 51 were Clinical Associates, 2 were Research Associates, and 1 was a Visiting Associate. On July 1, 85 new physicians reported for training of whom 25 are Clinical Fellows, 44 are Clinical Associates, and 16 are Research Associates. They are graduates of 31 medical schools located in 21 States. The total program consists of 188 physicians at this time--37 Clinical Fellows, 30 Research Associates, and 121 Clinical Associates.

Medical Board

Composed of representatives from each of the Institutes and the Clinical Center, the Medical Board of the National Institutes of Health serves a function and purpose parallel to that of the Senior Medical Board of a university hospital. It establishes standards and recommends policies having to do with the care of patients participating in the research activities of the Clinical Center. Its committees are: (1) a Clinical Research Committee which must pass on all projects involving Normal Volunteers; (2) a Medical Record Committee which continually surveys and evaluates medical reports kept on patients in the Clinical Center; (3) a Steering Committee which considers special problems pertaining to patient care; (4) a Credentials Committee which approves the qualifications of consulting physicians; (5) a Tissue Committee which studies the correlation of pathologists' reports to tissues removed from surgery patients with the clinical diagnosis; (6) an Education Committee which advises on matters relating to post-graduate medical education conducted at the Clinical Center; (7) a Normal Controls Committee which provides advice to the Medical Board on the recruitment, utilization, and other areas of interest involving Normal Control Volunteer patients.

The following amendment was added to the Organization and By-Laws document:

> Amendment No. 18., Revision of Article III, Section 3, B - Consultant Staff, 2a - Medical Care Consultants to describe the division of Medical Care Consultants into two categories, "Medical Care Consultants," and "Associate Medical Care Consultants."

Panel of Consultants

The adoption of Amendment No. 18 resulted in 23 physicians being designated Associate Medical Care Consultants. In addition there are 127 Medical Care Consultants. During the year 8 names were added to the panel. There were 632 visits made by consultants in fiscal year 1961. The system for calling "outside" medical care consultants has proved satisfactory. Institute staff members responsible for covering a particular specialty are designated as panel chiefs. If a staff member wishes the services of a medical care consultant he makes known his need to the responsible panel chief who makes the arrangements for securing the services of the consultant desired. In this manner a consultant can be used by more than one Institute during one visit to the Clinical Center.

Information Office

The informational and public relations aspects of the Clinical Center are handled by its Information Service. That office manages all inquiries from communications media and aids reporters and editors of newspapers and magazines, science writers, and radio and television personnel in preparation of material for the lay public.

Exhibits

"Selected Clinical Studies of the National Institutes of Health" -- Clifton K. Himmelsbach, M.D.

Annual Meeting of the PHS Clinical Society, Lexington, Kentucky, April 5-8; Annual Meeting of the Medical and Chirurgical Faculty of Maryland, Baltimore, Maryland, April 26-28; Annual Meeting of the Virginia Academy of General Practice, Washington, D. C., May 12-13; Annual Meeting of the American Medical Association, New York, N. Y., June 26-30; Annual Meeting of the Delaware-Maryland-District of Columbia Hospital Association, Washington, D. C., November 8-10.

Foreign Sound Tracks

Because of the large number of foreign visitors to the National Institutes of Health, the Information Service arranged for translation of the sound track of the NIH Film in Russian, French, German, Spanish and Japanese. Foreign visitors are now able to hear the NIH story in their own languages, with much better comprehension of the mission and resources of NIH.

Meetings held at the Clinical Center

Eastern Section Meeting of the American Federation for Clinical Research, January 6-7.

Senior Level PHS Orientation (employees), January 10.

NIH Lecture by Dr. John T. Edsall, January 25.

Heart Research Day - Montgomery County Heart Association and the NIH, February 3.

NIH Orientation Course (employees), February 14.

Junior Level PHS Orientation (employees), February 16.

Eastern Section Meeting of the Society of Research in Ophthalmology, February 17-18.

Special Program for Medical Students (PHS and NIH Orientation), February 28.

Senior Level PHS Orientation (employees), March 7.

Program Honoring 10th Anniversary of NIAMD, March 9.

NIH Lecture by Dr. Robert J. Huebner, March 15.

Meeting of the National Mortar Board Alumnae Chapter of Washington, D. C. March 20.

Mid-year Meeting of the American Association of Hospital Consultants, March 29-30.

Junior Level PHS Orientation (employees), March 30.

Symposium on Genetics Related to Dental Health, April 3-5.

Joint Meeting of the Society for Registered Technicians of Washington, D. C., and the Maryland Societies of X-ray Technicians, April 4.

Annual Meeting of the Council on Medical Television, April 5-7.

Health Education Conference, D. C. Department of Public Health, April 12.

D. C. Chapter of the American Home Economics Association, April 17.

Senior Level PHS Orientation (employees), April 25.

Conference of State and Territorial Dental Directors with PHS and Children's Bureau, May 3.

NIH Orientation Course (employees), May 9.

Montgomery County TB and Heart Association Annual Cardiac Symposium, May 17.

Junior Level PHS Orientation (employees), May 18.

"Contributions of Psychoanalysis to Pediatric Practice" - Held under the auspices of the Baltimore Psychoanalytic Institute, and Maryland and D. C. Chapters of the American Academy of Pediatrics, May 20-21.

Meeting of the Maryland Association for Mental Health, May 23.

Senior Level PHS Orientation (employees), June 28.

Junior Level PHS Orientation (employees), June 29.

Meeting of the Maryland Nurses Association, September 14.

Heart Research Seminar, September 19.

American Fracture Association - Program on Recent Advances in the Treatment of Gout, September 19.

NIH Graduate Course in Clinical Medicine, September 20.

13th Annual Postgraduate Assembly of the Endocrine Society, October 2-6.

Heart Research Seminar, October 10.

Junior Level PHS Orientation (employees), October 19.

Society for Hospital Administrative Associates, October 19-21.

Conference on Tissue Culture of Bone Marrow and Blood Cell Separation, October 20-21.

Senior Level PHS Orientation (employees), October 31.

Academic Memorial Tribute to Dr. Albert Deutch, November 3.

International Conference on Measles Immunization, November 7-9.

NIH Lecture by Dr. Roy Hertz, November 15.

10th Anniversary Program of NINDB, November 27.

Eight Interim Scientific Session of the American Rheumatism Association, December 8.

Lecture by Dr. Karl Folkers, President of the American Chemical Society, December 14.

There were 11 Combined Clinical Staff Conferences.

New Publications

PHS Publication No. 866, "The Normal Volunteer Program of the NIH Clinical Center."

PHS unnumbered publications: "Your Child is Coming to the Clinical Center," with attachment "The Friendly Clinical Center," a coloring book designed to acquaint children with the hospital environment before their arrival as patients; and, to be inserted where indicated, "For Parents of Children with Heart Conditions."

Revised Publications

PHS Publication No. 284, "Current Clinical Studies and Patient Referral Procedures," was revised in March and again in October.

PHS Publication No. 500, "Patient Admission Procedures."

PHS unnumbered publication, "Handbook for the Nursing Staff at the Clinical Center." In press.

PHS unnumbered publication, "Religious Services at the Clinical Center."

Clinical Center Contributions to the Professional Literature

Another important function of the Information Service is its editorial responsibility in connection with publication of Clinical Center contributions to the professional literature. Examples of 1961 contributions are:

Combined Clinical Staff Conferences of the Clinical Center for The Annals of Internal Medicine:

"Cystic Fibrosis of the Pancreas," Vol. 54, No. 3: 482-502, March 1961.

"Differential Diagnosis of Mitral Regurgitation in Childhood," Vol. 54, No. 6: 1223-1242, June 1961.

"Ecology of a Newly Recognized Common Respiratory Agent RS-Virus," Vol. 55, No. 3: 507-524, September 1961.

"Tangier Disease," December 1961.

Combined Clinical Staff Conference of the NIH published in Antibiotics & Chemotherapy:

"A New Penicillin Derivitive Resistant to Penicillinase," Vol. XI, No. 9: 537-554, September 1961.

"Goals for American Hospitals," by Jack Masur, M.D. Hospitals, Vol. 35, No. 22: 56-58, November 16, 1961.

"Dedication of the Mental Health Research Institute Building," by Jack Masur, M.D. Behavioral Science, Vol. 6, No. 1: 55-56, January 1961. (Remarks at the dedication ceremonies for the new Mental Research Institute Building at the University of Michigan, Ann Arbor, Michigan, January 29, 1961.)

"Response of the Human Dental Pulp to Amalgam Restoration," by H. Swerdlow and H. Stanley. Journal of Oral Surgery, Oral Medicine, and Oral Pathology. In press.

"The Variation of Facial Vertical Dimension During the Transition from Natural to Immediate Dentures," by H. Swerdlow. University of Washington thesis, 1961.

Abstract: "Dietary Requirements for Balance Studies," by Edith A. Jones. Proceedings of the 3rd International Congress of Dietetics, London, England, p. 193, July 1961.

"Bacteriological Effect of Ultraviolet Light on a Surgical Instrument Table," by Janet Fitzwater, B.S., M.S. Public Health Reports, Vol. 76 (2): 97-104, February 1961. Modern Medicine, (abstract), p. 97, June 1961. Hospital Notes, Georgia Hospitals, April 1961.

"New Equipment for the Operating Room," by Janet Fitzwater, B.S., M.S. The American Journal of Nursing, Vol. 61 (8): 54-55. August 1961.

"Mycosis Fungoides," by Elizabeth Edwards, B.S., M.S. American Journal of Nursing, Vol. 61 (2): 61-63. February 1961.

"Care of the Patient with Myocardial Infarction," by Mildred Crawley, B.S., M.A. American Journal of Nursing, Vol. 61 (2): 68-70. February 1961.

"Equipment for Collecting Specimens," by Marie M. Lech, B.S., M.A. American Journal of Nursing, Vol. 61 (3): 91. March 1961.

"Observer Factors in the Measurement of Blood Pressure," by Jane Wilcox, B.A., D.Sc. Nursing Research, Vol. 10 (1): 4-18. Winter issue, 1961.

"Case 21 - Successful Reassessment of a Nursing Plan," by 3-East Psychiatric Nursing Service. Toward Therapeutic Care, a Guide for Those Who Work With the Mentally Ill, 1961: 84. Published by Group for the Advancement of Psychiatry, 104 pp. 1961.

"Pharmacy - Central Sterile Supply," by Milton W. Skolaut. American Journal of Hospital Pharmacy, Vol. 18, p. 200, March 1961.

"Cataloging a Problem?," by Milton W. Skolaut. American Journal of Hospital Pharmacy, Vol. 18, p. 294, May 1961.

"Ethylene Oxide Sterilization," by Milton W. Skolaut. American Journal of Hospital Pharmacy, Vol. 18, p. 410, July 1961.

"Pharmacy - Central Sterile Supply," by Ernest S. Lentini, edited by Milton W. Skolaut. American Journal of Hospital Pharmacy, Vol. 18, p. 670, November 1961.

"The Formulation of Radioactive Kryton^{85} for Intravenous Use," by William H. Briner. American Journal of Hospital Pharmacy, Vol. 18, pp. 170-175, March 1961.

"Principles in the Production and Formulation of I^{131} Labeled Polyvinylpyrrolidone and Cr^{51} Labeled Sperum Albumin for Parenteral Use," by William H. Briner, Robert S. Gordon, M.D., and Thomas Waldmann, M.D. Proceeding of the Symposium of the Gastrointestinal Tract and Plasma Proteins in Health and Disease. In press and being published in a foreign country.

"A Note on the Formulation of Iodine-131 Labeled Polyvinylpyrrolidone for Intravenous Administration," by William H. Briner. Journal of Nuclear Medicine, Vol. 2, p. 94, April 1961.

"An Increased Incidence of Paradoxical Hypertension Following Resection of Aortic Coarctation Under Halothane Anesthesia," by Thomas B. Davis, M.D., Dean H. Morrow, M.D., C. L. Hebert, M.D., and Theodore Cooper, M.D. Anesthesiology, Vol. 22, No. 1: 232. January-February 1961.

"Intravenous Barbiturate Anesthesia for Dental Outpatients," by G. R. Christenson, M.D., C. L. Hebert, M.D., and Edward J. Driscoll, D.D.S. Anesthesia and Analgesia Current Researches, Vol. 40, No. 1: 77, January-February 1961.

"The Effect of Fluothane on Myocardial Contractile Force in Man," by Robert D. Bloodwell, M.D., R. Cecil Brown, M.D., G. R. Christenson, M.D., Leon I. Goldberg, M.D., and A. G. Morrow, M.D. Anesthesia and Analgesia Current Researches, Vol. 40, No. 3: 352. May-June 1961.

"The Effects of Halothane on Myocardial Contractile Force and Vascular Resistance: Direct Observations Made in Patients During Cardio-Pulmonary Bypass," by Dean H. Morrow, M.D., and Andrew G. Morrow, M.D. Anesthesiology, Vol. 22, No. 4: 537-541, July-August 1961.

"The Effect of Digoxin Pretreatment of Heart Contractile Force During Thiopental Infusion in Dogs," by Alan H. Goldberg, M.D., Harriet M. Mailing, Ph.D., Thomas E. Gaffney, M.D., with the technical assistance of M. A. Williams. Anesthesiology, Vol. 22, November-December 1961.

"The Chronotropic and Inotropic Effects of Halothane: A Comparison of Effects in Normal and Chronically Cardiac Denervated Dogs," by Dean H. Morrow, M.D., Thomas E. Gaffney, M.D., John E. Holman, D.V.M. Anesthesiology, Vol. 22, No. 6. November-December 1961.

"Diaphysical Aclasis (Multiple Exostoses) on Guam," by Robert S. Krooth, M.D., Martin T. Macklin, M.D., and Theodore F. Hilbish, M.D. American Journal of Human Genetics, Vol. 13, No. 3: 340. September 1961.

"Gynecography: Technique and Interpretation," by Emil Schulz, M.D., and Saul W. Rosen, M.D. The American Journal of Roentgenology, Radium Therapy & Nuclear Medicine, Vol. 86, No. 5: 866. November 1961.

"An Atlas of Tomographic Anatomy of the Head," by Marvin L. Daves, M.D., and William Loechel. Published by Charles C. Thomas Co., October 1961.

"Casts, Splints for Rheumatoid Arthritis," by David M. Fried, M.D., Joseph J. Bunim, M.D., Mario L. Salvanelli, and Vida Jo Niebuhr. Modern Medicine, Vol. 29, No. 20: 83-91, October 2, 1961.

"Implication of Chromosome Structure and Replication on Hazard of Tritiated Thymidine and the Interpretation of Data on Cell Proliferation," by E. P. Cronkite, M.D., S. W. Greenhouse, M.D., G. Brecher, M.D., and V. P. Bond, M.D. Nature, Vol. 189, No. 4759: 153-154, January 14, 1961.

"Reticulocyte Size and Erythropoietic Stimulation," by G. Brecher, M.D., and F. Stohlman, M.D. Proceedings of the Society for Experimental Biology and Medicine, Vol. 107: 887-891, 1961.

"A Modification of the Klett-Summerson Colorimeter," by H. H. Marsh, M.D. American Journal of Clinical Pathology, Vol. 36, No. 6, December 1961.

"Measuring and Recording Symptoms and Behaviors on a Metabolic Unit," by Robert M. Beauregard, M.S.W., Ralph W. Wadeson, Jr., M.D., and Louise Walsh, R.N. Journal of Chronic Disease, Vol. 14, No. 6, December 1961.

Distinguished Foreign Visitors

Dr. Rafael Hernandez, Member, Chamber of Deputies, Cordoba, Argentina.

Dr. Nicholas Rassidakis, Clinical Director, State Mental Hospital, Athens, Greece.

Dr. R. R. A. Coombs, Department of Pathology, Cambridge University, England.

Dr. S. Singh And, Dean, Amritsar Medical College, Punjab, India.

Dr. Theodore V. Gjurgjevic, Deputy Director, Andrija Stampar School of Public Health, Zagreb, Yugoslavia.

Dr. Mohammed Hasein Assadi, Member, Iranian Parliment, Teheran, Iran.

Dr. Robert Montgomery, Medical Research Council of Great Britain, Jamaica, B.W.I.

Dr. Murillo Belchoir, Director, Service Biometria Medica, Ministry of Health, Brazil.

Dr. John Cronin, Member of House of Commons, London, England.

Dr. Frank D. Schofield, Assistant Director, Medical Research, Public Health Department, Port Moresby, Territory of Papua and New Guinea.

Dr. Paulino Garcia, Chairman, National Science Development Board of the Philippines.

Mr. Derek N. M. Bryceson, Minister of Health and Labor, Tanganyika.

Dr. Alex Johnson, Senior Medical Officer, Commonwealth Department of Health, Australia.

Mr. Christopher Jolliffe, Deputy Director, Department of Scientific and Industrial Research, British Government.

Mr. Herman Tritelvitz, Member of Parliment and former Minister of Labor and Welfare of Saar, West Germany.

Maj. Gen. Felix L.Geuens, Inspector General, Belgian Armed Forces.

Dr. Keizo Nakamura, Director, National Institute of Health, Tokyo, Japan.

Dr. Herbert Kraus, Undersecretary of State, Federal Secretariat of Health, Yugoslavia.

Dr. Desai, President, Bombay Rheumatism Society, Bombay, India.

Dr. Allan Gilbourne, Chief Dental Officer, Jamaica, B.W.I.

Dr. Todor Curuvija, President, Council of Public Health, State of Croatia, Zagreb, Yugoslavia.

Dr. Yoo, Secretary General, Korean Association for Mental Health.

Dr. W. M. C. Keane, Medical Superintendent, St. Vincent's Hospital, Melbourne, Australia.

Dr. Grundy, Assistant Director General, WHO, Geneva, Switzerland.

Ministers of Health of Dahomey, Niger, Upper Volta and Ivory Coast.

Sir Earl Page, former Minister of Health of Australia.

Mr. Matrika Prasad Koirala, Permanent Representative to the UN from Nepal.

Dr. George Belios, Director, Division of Malaria and Tropical Diseases, Ministry of Social Welfare, Athens, Greece.

Dr. Andre Primms, Director of Federation of Belgian Hospitals.

Dr. Pierre de Schouwer, Medical Attache, Belgian Embassy.

Col. Soedjono, Surgeon General, Indonesian Army.

Dr. J. A. Meade, Medical Superintendent, Waikato Hospital, Hamilton, New Zealand.

Dr. Ivan Jeffery, Assistant Director of Hospitals, Department of State, New Zealand.

Colonel Azil, Director, Indonesian Malaria Eradication Program.

Mr. Addou Sidekow, Secretary General of the Ministry of Foreign Affairs, Niger.

Professeur Maurice Bariety, Superintendent of all Paris hospitals and Membre de l'Academie de Medecine, France.

Mr. Cliff Murray, Editor of Lesmore Star, Australia.

Dr. Harold Kramer, Director, Institute of Clinical Pathology and Medical Research, Department of Public Health, Sydney, Australia.

Dr. Jaroslav Sterzl, Biological Institute, Czechoslovak Academy of Sciences, Prague, Czechoslovakia.

Dr. Voja Djukanovic, Director of Federal Institute of Health, Yugoslavia.

Dr. A. V. Chaklin, Chief Medical Officer, Cancer, WHO, Geneva, Switzerland.

Dr. Ivica Marinic, Deputy President, Federal Council for Scientific Research, Yugoslavia.

Dr. Hirustiati Subandrio, Acting Minister of Health, Indonesia.

Dr. Peter G. Voutov, Envoy Extraordinary and Minister Plenipotentiary, Bulgaria.

Contingent of the Medical Faculty of the Free University of West Berlin, Germany.

Five members of the faculty of Ciencias Medicas School of Medicine, Rio de Janeiro, Brazil.

Eight Japanese science writers of the Asian Foundation and Japanese Publishers and Editors Association.

Twelve medical students from the University of Lovanium, Leopoldville, Congo.

22 Japanese physicians from the 4th Europe-U.S. Medical Survey Team.

257 delegates from the Second International Congress of Neurosurgeons.

Japanese Commission on Poliomyelitis.

Miss Delores Francisco, National Executive Director, Philippine Mental Health Association, Queson City, Republic of the Philippines.

Soviet Visitors

Dr. Afandsii S. Troshin, Director of Institute of Cytology, Academy of Sciences, Moscow.

Dr. G. D. Smirnov, Institute of Animal Morphology, Academy of Sciences, Moscow.

Dr. N. G. Doman, Institute of Biochemistry, Academy of Sciences, Moscow.

Professor P. K. Anokhin, Head, Laboratory of Neurophysiology, Academy of Medical Sciences, Moscow.

Dr. Fedor G. Uglov, Leningrad Medical Institute.

Dr. A. A. Akhren, Zelinski Institute of Organic Chemistry, Academy of Sciences, Moscow.

Dr. A. V. Tcbakline, Head of Cancer Unit of WHO, Geneva, Switzerland.

Dr. Leva Melnikov, Councillor to Permanent Mission of USSR to United Nations.

Dr. Nikolai Petrovich Yelinov, Deputy Director of Leningrad Chemical-Pharmaceutical Institute.

Dr. Victor Zhdanov, Executive Secretary, Academy of Medical Sciences, USSR.

Professor Aleksandr Nikolayevich Studitskiy, Institute of Animal Morphology, Academy of Sciences, Moscow.

Dr. Boris G. Yegorov, Director, Scientific Research Institute of Neurosurgery, Academy of Sciences, Moscow.

USSR Cancer Delegation:

Dr. N. N. Aleksankrov
Dr. R. Ye Kavetskiy
Dr. Ye G. Kudimova
Dr. B. V. Fanardzhyan
Dr. K. A. Pavlov

USSR Dental Mission:

Dr. V. F. Chekin
Dr. A. I. Dvoinikov
Dr. V. I. Karnitski
Dr. A. I. Pozdnyakova
Dr. A. I. Rybakov

Calendar Year 1961

PUBLIC HEALTH SERVICE NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES

CLINICAL CENTER

CLINICAL & PROFESSIONAL EDUCATION BRANCH

CC-02
Serial No.

Missions:

General - This organization is concerned with diversified programs of professional education and other activities with educational implications for the Clinical Center and the National Institutes of Health.

Specific - This Branch administers the following programs:

..... Clinical and Professional Education

a. Clinical Fellows
b. Clinical Associates
c. Research Associates

..... CORD Deferments "Matching Program"

..... Training outside the Service for Commissioned Officers and Civil Service Personnel at NIH

..... NIH Orientation (Compass) Courses

..... NIH-PHS Senior Level and PHS New Employee Orientation Courses

..... High School Science Teachers Chemistry-Physics Institute

..... Science Research for High School Students

..... Summer Fellowships in Medical Research for High School Students

..... Graduate Program at NIH (formerly NIH-USDA), an evening course program operating with the approval of the Director, NIH, and under license by the Federal Government to the "Foundation for Advanced Education in the Sciences, Inc."

..... Television research, development, and program activities of the Clinical Center and NIH

Residency Programs

Two types of residencies, offered at the Clinical Center, are administered through this office.

1. Clinical Fellows

The Clinical Center professional departments providing complete training in specialty fields (including research training in components that are not available elsewhere) are listed below:

Service	Approved	Residents currently in Training
Anatomical Pathology 1/	3 years	7
Clinical Pathology 1/	3 years	6
Diagnostic Radiology	4 years	4
Oral Pathology	2 years	1
Periodontia 2/		3

The Institutes also conduct residency training. Current approved Clinical Fellowship programs are listed below:

Service	Institute	Approved	Residents Currently in Training
Internal Medicine	NHI	1 year	6
Neurology	NINDB	2 years	2
Psychiatry	NIMH	1 year	3
Ophthalmology	NINDB	2 years	4
Dermatology	NCI	1 year	2

Clinical Associates

All seven of the Institutes have appointed young physicians to clinical services generally given to residents. These were assignments that could not qualify for residency training without changes in the operation of the program, per se. The Institute's programs, which require one or more years of residency prior to appointment, include extensive laboratory research investigation.

Since activation of the PHS-CORD program, nearly all Clinical Associate appointments by the Institutes have been made through this arrangement. Staff patterns are stabilized for one or more years in advance. Deferment for train-

1/ Combined 4 year program in Clinical and Anatomical Pathology is also offered.
2/ In 1961, NIDR discussed its Periodontia Residency Program with ADA officials and advisors and decided that the residency program would be more useful in a program of advanced training beyond broad requirements rather than the basic training of periodontists. For this reason, the residency program was discontinued and replaced by a program of advanced training. Those who were in training will receive Board credit.

ing under the UMT and Service Act and an assurance of future duty with one of the Institutes has made these appointments doubly attractive.

Research Associates

This training program for young physicians, initiated through the Scientific Advisory Committee in 1957, was designed to prepare them for investigative careers in the basic sciences. It combines some of the advantages of fulltime study in a graduate school with postdoctoral training in a research laboratory.

This two year program consists of a series of formal lectures in the basic sciences; informal seminars in biochemistry, physiology, microbiology, genetics and psychology; and, a weekly Journal Club meeting devoted to discussions of the problems encountered in the laboratory and the presentation of reviews in each specific field of interest.

These Associates, generally appointed by the Institute's Scientific Directors after completion of internship or the first year of residency, engage for that part in laboratory research under supervision of a preceptor.

The CORD Program

The mechanisms established in this program have been successfully incorporated into the selection process for Clinical and Research Associates. Deferments continue to be arranged by this office's representations to the PHS-CORD Committee through official channels. The Chief, a member of the Committee, participates in the deliberations on all NIH nominees. Since NIH began requesting deferment for specific assignments in specific Institutes, our pattern has become standard deferment procedure throughout PHS.

The "Matching Program"

In 1958 this program was developed to resolve serious problems which had arisen due to certain aspects of the selective process in the Clinical and Research Associate programs. In collaboration with the Scientific and Clinical Directors of participating Institutes, this office proposed an operational plan by which final selection of candidates would be determined by "matching" the applicants preferences with the availabilities of the Institutes involved.

In 1960 the program underwent some "fringe" changes. The revised program has proven an effective instrument for producing large numbers of applicants with background satisfactory to NIH standards and whose interests and training have prepared them for NIH consideration. The program combines service and training over a period of two years after the candidate's period of deferment from obligated duty for residency training elsewhere. Besides eliminating much unproductive processing and interviewing of applicants, the program has brought Institute harmony in final selection and appointment of these junior staff members. This system has also made it possible for PHS's other Services to recruit young physicians of high caliber who could not be accommodated by NIH programs. Other statistics on the 1961 "Matching Program" (1963 appointments) are set forth in attachment A.

"Matching Program" Clinical and Research Associate Statistics

Total Inquiries		1464 ↓
Non Eligibles		25
Applications Sent		650 ↓
Files Established		303
Withdrew		7
Rejected before selection by Institutes		17
Considered for Appointment		279
Interviews Arranged		1087 ↓
Total Appointed		133
Clinical and Research Associates	104	
Others Appointed	29	
For Active Duty in 1963	84	
For Active Duty in 1962	22	
For Active Duty in 1964	12	
For Active Duty in 1965	11	
For Active Duty in 1966	1	

Candidates Considered by Programs for which they Applied

Clinical Associate Only	120
Research Associate Only	20
Clinical and Research Associate	133

Analysis of Candidates by Institute to which they Applied

INSTITUTES	TOTAL	CLINICAL ONLY	RESEARCH ONLY	BOTH
NCI	99	38	2	59
NHI	139	43	10	86
NIAID	93	23	13	57
NIAMD	151	39	14	98
NIDR*	7	2	3	2
NIMH	64	22	8	34
NINDB	54	28	5	21

*These were for Medical Officer positions.

NOTE: At the conclusion of this year's program, the Scientific and Clinical Directors, in a combined meeting, recommended several changes in the "Matching Program":

1. Preparation and placement of announcements of the 1962 program setting forth the procedures, deadline dates, designation of the office handling all correspondence and interviews, and other pertinent data for publication in the following:

(a) Journal of AMA - the Residency and Internship edition

(b) Journal of the Association of American Medical Colleges - "Medical Education"

2. Revision of the "Building Medical Manpower" to conform with the scheduled announcements.

3. Letters to candidates, together with a copy of the announcement, shall direct that all correspondence and interviews be arranged through the Chief, Clinical and Professional Education, National Institutes of Health.

Schedule of the 1962 calendar and Program Procedures are set forth in Attachment B.

Support of Clinical Education

The Education Committee of the Medical Board, with the Chief of this Branch serving as Chairman, conducted 11 Combined Clinical Staff Meetings and Clinicopathologic Conferences. The dates and attendance of these inter-disciplinary and inter-Institute exchanges of professional knowledge are herewith listed:

Date	Class.	Topic	Attendance
1/12/61	CCSM	Morphologic and Etiologic Aspects of Gluten-Induced Intestinal Malabsorption	103
2/9/61	CCSM	The Metabolism of the Catecholamines: Clinical Implications	117
2/23/61	CCSM (night)	A New Penicillin Derivative Resistant to Penicillinase - Dimethoxyphenyl Penicillin	64
3/16/61	CCSM	Tangier Disease (A New Genetically Determined Lipidosis?)	100
4/20/61	CCSM (night)	Medical Genetics	197
5/11/61	CCSM	Exfoliative Cytology of the Oral Mucosa	37
9/21/61	CCSM	Central Core Disease. A New Mitochondrial Abnormality of Muscle	101
10/26/61	CPC	A Case of Posterior Fossa Pathology	45
11/2/61	CCSM	The Neoplastic Plasma Cell	118
11/28/61	CCSM	The Syndrome of Sarciodosis, Psoriasis	204

Date	Class.	Topic	Attendance
12/14/61	CCSM	The Present Status of Cancer Chemotherapy	158

Staff support for all meetings and conferences was supplied by this office.

Among the responsibilities of the Chief of the Branch are those pertaining to (1) recent developments in Graduate Medical Education, (2) advances in all media of mass communication, and (3) stimulation and interpretation of the NIH Clinical and Professional Education programs with deans and other officials of medical schools with a view to recruitment of young physicians with good background and qualifications for the programs offered at NIH and PHS. In the fulfillment of this responsibility the following meetings and conferences were attended:

1/14-28/61	Wetzlar, Oberhausen and Frankfort, Germany, to work with engineers of the Leitz Optical Company on design, development, and construction of a new form of color television ophthalmoscope. Exchanged information with European scientists interested in the television ophthalmoscope, and who are working with related instrumentation, (Ridley and Butterfield, London; Walleman and Branemark, Gothenberg, Sweden; Harders, Hamburg; and Thorsen, Stockholm.)
5/7-15/61	London - "Symposium on Television in the Medical School" held at the London Hospital Medical College, sponsored by the Association for the Study of Medical Education. Gave a formal presentation, May 10.
4/6-7/61	Represented the Director, NIH as host for the Annual Meeting of the Council on Medical Television held in the Clinical Center.
6/26 and 9/20/61	New York City to attend Medical Television Executive Committee meetings.
7/18/61	Dahlgren, Virginia, to assess and arrange for transfer of surplus electronic equipment for the television unit involving no transfer of funds.
11/14/61	To Stamford, Connecticut, to obtain information for new O.R. camera design and other data from the Columbia Broadcasting System Laboratories.
HONORS:	Elected a Fellow of the Medical Society of London, December, 1961.

The Education Committee met ten times during 1961. Following precedent of former years, residency appointments were recommended, staff meetings were

planned, and the meetings to be submitted to the Annals of Internal Medicine were determined. Dr. Joseph Bunim supervised the editorial work on the manuscripts selected for publication. This office supplied staff support.

Training Outside the Service

This year, the number of NIH personnel applying for training outside PHS continued to increase. This office reviewed all applications of Commissioned and Civil Service personnel and provided counselling service when requested during the first semester of 1961. Because of the program's phenomenal growth and the financial implications, and recognizing the impact on future research programs, NIH policies were reviewed and mechanisms developed to provide qualified assessment of justification for training and competent evaluation of the training benefits.

At the beginning of FY 62, this function was transferred from this office to the Personnel Management Branch, NIH. For this reason, the annual statistical data is not available in this office.

NIH-USDA Graduate School Program

For many years, this type of training (night courses) has been of increasing interest to NIH personnel. This year, 326 students were registered for 21 courses in the spring semester. The trend toward scientific courses still pertains.

Upon conclusion of the spring semester, the 1954 Memorandum of Agreement between NIH and the USDA Graduate School was terminated.

Graduate Program at NIH

During the summer the "Foundation for Advanced Education in the Sciences, Inc." negotiated a license with the Government to conduct the evening program under the title; "Graduate Program at NIH."

Operating procedures, administrative agenda, and the curriculum of the Graduate Program at NIH were established and published. With registration and assignment of students for the classes offered during the fall semester, 1961, this program became operative. 675 students are now enrolled in training under the program. Of the 36 courses offered, 30 were given. The lowest number of students in any class is four. As anticipated, a more flexible and efficient administration has resulted.

As part of the administrative arrangements of the program, NIH has permitted the Chief of Clinical and Professional Education to serve as the managing Director of the Foundation for the Graduate Program at NIH. He serves in this capacity without pay. These services are considered a part of the NIH contribution. NIH also contributes space, utilities, and supporting services to the Foundation. The Foundation supplies the administrative and educational staff. It also protects the Government from property damage in the conduct of the program.

Recognizing the ultimate need of an educational facility which would incorporate all requirements attendant to the successful operation of this program, the Foundation instructed its managing Director to initiate action for the design of a Center for Advanced Education in the Sciences. Architectural drawings and floor plans of a modern, functional building are presently under study.

Commissioned Officer Student Training and Extern Program (COSTEP):

The COSTEP Program entered its sixth year of formal organization in 1961. This program is designed to introduce young professional students to the PHS at an advanced stage in their predoctoral training through providing them with employment affording an opportunity for professional growth. The Chief of Clinical and Professional Education served as Chairman of the PHS COSTEP Committee for a five year period ranging from its organization in 1956 through 1960. The Deputy Chief of this Branch has been appointed to serve as Chairman of the Committee for 1961-62.

In the summer of 1961 seven Institutes and two Divisions employed 27 medical, 9 dental, 2 veterinarian, 3 engineering, 1 nursing, and 3 scientist students. This year for the first time the scientist category included a physics major who had completed two years of his undergraduate work.

The medical students on duty during the summer of 1961 were drawn from 27 schools of medicine as against 20 for summer of 1960.

Year-round participation in COSTEP has steadily increased. The number of medical students on duty during periods other than summer months increased from 3 in 1960 to 9 in 1961. Total for all categories (summer months excluded) rose from 6 in 1960 to 13 in 1961. This fall and winter 9 medical, 3 engineering, and 1 scientist student have been on duty. The number of medical schools including an elective quarter in their curricula (COSTEP tour of duty acceptable) seems to be increasing.

Evaluation schedules were completed by students and preceptors. These are currently being analyzed by DCOP. Preliminary findings on 38 schedules returned by COSTEP officers on duty at NIH are as follows:

92% indicated that they would be interested in active duty with the PHS after completion of their professional education.

95% stated that they had received "just about the right amount" of supervision.

73% had other opportunities for professional employment at the time they applied for COSTEP.

69% of the students felt their work experience would be of considerable value; 31% - of some value.

Out of 24 medical students 16 (67%) indicated interest in a PHS internship; 6 out of 11 eligible applied.

Out of 8 dental students 7 (88%) indicated interest in a PHS internship; 3 out of 3 eligible applied.

Our informal review of both student and preceptor evaluation schedules prior to submission to DCOP for analysis indicated (in keeping with findings of previous years) a high degree of satisfaction with the program. This was further substantiated by the inactivation interviews routinely held with students prior to their leaving NIH.

A. Table I

Clinical and Research Associate Appointments of Former COSTEP Students

Year	Appl. Considered 1/	Appointments 2/	COSTEP Considered	COSTEP App'ts
1956	---	---	1	1 for 1957
1957	---	---	---	---
1958	145	73	3	1 for 1960
1959	172	58	13	3 for 1961
1960	180	65	10	5 for 1962
1961	279	103	10	6 for 1963
TOTAL	776	299	37	16

1/ Includes COSTEP Applicants 2/ Includes COSTEP Appointments

In light of the data presented in A. Table I (above), it is interesting to reflect on our concept of the role of NIH in COSTEP when the mechanism was initiated in 1955. At that time we felt it quite unlikely that COSTEP would be a method of recruiting scientists for junior positions and for careers at NIH. Primarily the NIH role was seen as one of indirect and long-range assistance in recruiting officers for other Bureaus of the Service. Our current conclusion is that we were incorrect in our 1955 presumption that the program was not a recruiting mechanism per se for NIH. The high calibre of COSTEP students is evidenced by the appointment of 1 out of 2 applicants as compared with the 1 out of 3 ratio for total applicants. In relation to this point, it should be carefully noted that the COSTEP applicant receives no special consideration because of his COSTEP tour of duty. In addition to the very tangible results just cited, innumerable intangible benefits accrue to NIH and the Service as a result of these young professional people having served at NIH.

Seminars:

Seven evening seminars were held by NIH scientists primarily for the medical, dental, veterinary medicine, and Ph.D. candidates in the basic and biological sciences. COSTEP students assigned to other PHS Bureaus were extended invitations. In addition the seminars were open to science students employed under the Civil Service summer program. Usually three to five NIH staff members were present for each session.

The dental students also attended two seminars conducted by staff of the Clinical Center Dental Department, as well as two one-half day sessions at NNMC conducted by Doctors Panky and Man on "Complete Mouth Rehabilitation Technique." In addition, the dental COSTEP officers organized a series of six afternoon seminars which were conducted by scientists operating in research areas of particular interest to dentists.

Public Health Educators Added to Program:

The Deputy Chief served as a resource person to staff of Health Information and Education Branch of the Division of Community Health Practice and DCOP, in evolving plans for the inclusion of potential Public Health Educators in COSTEP.

Interviews, Inquiries, Consultant Service

There are about 100 interviews per annum granted students who are seeking information on COSTEP and other student employment programs. The inactivation interviews, which average about 50 per year, are additional. The COSTEP program stimulates the referral of students ranging from the pre-college level through the graduate level for counseling. Aid is given to DCOP relative to the preparation of printed brochures and public information items on COSTEP.

Problems:

The program continues to have the problems of limited space (many scientists indicate they would like to have a COSTEP student but have no physical space in which the man could work) and budget. On the latter item, COSTEP positions, unfortunately, are usually in direct competition with regular positions, equipment needs - in effect with all of the operating needs of the laboratory. The 1961-62 PHS COSTEP Committee reiterated the need for exploration for some type of central funding at its December meeting.

COSTEP Study:

Action for this study was initiated by this Branch in 1960, via the PHS COSTEP Committee. The study data supports the concept that COSTEP is a valuable program to the Service. For example - of 1957's medical COSTEP students, 42 of 80 (as of 1960) were on active duty or in CORD; internships and CORD yields are greater proportionally. There has not been a long enough time since the summer of 1957 (records not on machine cards prior to 1957) for many Regular Corps appointments. NIH experience has been that the

COSTEP students, on an overall basis, have competed somewhat more successfully than the total group of applicants for the Clinical and Research Associate programs.

Some recommendations of the study judged pertinent for inclusion in this report are:

1. COSTEP recruitment and employment be continued at a rate of 50 officers each year in each Bureau.

   a. Funds be segregated for this level of operation in each year so that Division of Personnel may plan to provide recurring recruitment and placement on a stable basis.

2. Continued study of the conduct and yield of COSTEP shall be made:

   a. In relation to other recruitment-retention activities wherever valid comparison can be made.

   b. In relation to a total career development program within the Service.

3. In each Bureau, annually, establish a total number of COSTEP positions, to be filled only by assignment of commissioned officers (H.S.O.) for the ultimate purpose of recruitment of career officers to the Commissioned Corpos of the Public Health Service. These assignments should be defined by category of student, Division, and site of assignment.

4. For the guidance of Division of Personnel (now DCOP), commitments should be made in a specified month of each year and be considered as a firm obligation for commission and utilization the next fiscal year - to be achieved by encumbrance of funds in each Bureau of the Service.

Orientation Programs:

NIH Orientation (Compass) Course

In 1961 four courses were attended by a total of 976 NIH employees. When there was sufficient interest a Question and Answer period for Commissioned Officers (primarily for new COs but also open to veteran officers) was held as an integral part of each course. Representatives from PHS-DCOP, NIH CO Unit, and staff of this Branch served as resource people for these meetings. A number of administrative personnel interested in rules and regulations pertaining to the Corps also attended.

The course, which has been presented fifty-nine times, is constantly being modified; currently a major revision is under study.

PHS Senior Level Orientation Course

The NIH segment (one day of a five day program for C.O.'s and GS-9 and above nominated by their respective Bureaus) was presented on the following dates: January 10, March 7, April 2, June 13, and October 31.

PHS Orientation for New Employees

Approximately one-half day of this two-day program is spent at NIH. Following a general orientation and tour of the Clinical Center, conducted by the Special Events Section, the group is addressed by the Chief of Clinical and Professional Education or a senior staff member regarding the overall mission of this Bureau. Six such sessions were held in 1961; the average attendance for each session was 37.

Special Orientation Programs

Date	Program	Attendance
* 1/19/61	Brazilian Medical Team	5
* 2/1/61	Harvard Public Health Students (Accompanied by Dr. Hugh R. Leavell)	12
* 2/28/61	A Special Program for Medical Students (5 medical schools represented)	30
3/8/61	Meeting for Commissioned Officers Planning to Inactivate in July	47
* 3/15/61 & 3/21/61	Residents - Washington Hospital Center (two groups - two separate days; program approximately two hours each day)	5 6
* 5/9/61	Public Health Service Representatives	15
6/26/61	High School Students	7
6/29/61	High School Science Teachers	15
7/6/61	Commissioned Officers Reporting to NIH (primarily for physicians with patient care responsibility)	95
7/12/61	COSTEP and Civil Service Summer Employees	55
8/17/61	COSTEP Visit to PHS Hospital - Baltimore (10 med., 5 dent., 1 nurse)	16
8/30/61	COSTEP Dental Students Visit to WRAMC and	7

* In cooperation with Special Events Section

High School Science Teachers Chemistry-Physics Institute:

This eight week program for high school teachers of science sponsored by American University, through a grant made by the National Science Foundation, was conducted for the sixth year in 1961. Fifteen teachers from nine states and the District of Columbia reported to NIH on June 28. The following NIH Institutes and Divisions participated in the program: NCI, NHI, NIAMD, NIMH, DRS. The teachers worked in NIH laboratories (on a non-pay basis) from 10:00 a.m. to 5:00 p.m. every Wednesday, Thursday and Friday. Evaluation of the program by both the teachers and the preceptors was favorable.

Science Research Program for High School Students:

This program per se came into being in 1961 under the sponsorship of the Joint Board of Science Education of the Washington Academy of Sciences and the District of Columbia Council of Engineering and Architectural Societies. The program was supported by a grant from the National Science Foundation. The general purpose of the program is to provide students of high ability with educational experiences in the sciences and mathematics - not normally available in high school courses - in order to facilitate their scholarly development.

Seven students worked at NIH (full work days) for approximately eight weeks beginning June 26. They were paid $10 per week expense money from the NSF grant. Free selection by scientists resulted in the following distribution: NHI-4, NIAMD-1, DRS-1, NCI-1. Both preceptors and students were extremely favorable in their evaluation of the program. The Associate Director who supervised the day to day operation felt ....."that many students formed and some confirmed plans for careers in science." Without exception the participating scientists indicated that they were in favor of continuing the program next summer.

For this particular program there were 170 qualified applicants representing 63 high schools. Thirty-six students were selected and placed as indicated below:

U. S. Department of Agriculture - Beltsville	8
Walter Reed Army Institute of Research	6
G. W. U. Surgical Research Laboratory	1
Resources Research, Inc.	1
Goddard Space Flight Center	3
Melpar, Inc.	3
National Bureau of Standards	2
National Institutes of Health	7
American University - Chemistry Department	4
Georgetown University	1
Total	36

Some appreciation of the national import may be gained from the fact that almost 7,000 superior secondary school students were provided with the opportunity to obtain tuition-free science training during the summer of 1961.

This was accomplished through some 158 cooperating colleges, universities and research organizations.

Summer Fellowships for High School Students in Medical Research:

Sponsored by the Montgomery County Tuberculosis and Heart Association, Montgomery County Board of Education, National Naval Medical Center, Montgomery County Health Department, and the National Heart Institute, NIH. Purpose - to attract capable, inquiring young minds to the medical profession by providing opportunities for students to learn about and participate in research programs now in progress. Seminars were presented on five Saturday mornings from 10:00 a.m. to 12:00 noon in Wilson Hall. Approximately 200 high school students(16 years of age) drawn from Montgomery County attended each session. Several $200 scholarships provided by the Montgomery County Tuberculosis and Heart Association were awarded on the basis of competitive examination. Concurrent with the awarding of the scholarships was the opportunity to work in a research laboratory of NNMC or NHI. Two students were placed at the Navy installation and five in laboratories of the National Heart Institute.

The relationship of this Branch was primarily effected through the Deputy Chief's serving on the governing Research Fellowships Committee. In addition, the Deputy Chief and the Television Unit of this Branch, working with the Clinical Endocrinology Laboratory of NHI, produced a 30 minute video tape entitled "Introduction to the Laboratory." This tape backed up by an NHI scientist constituted the seminar presented on February 11. Plans are well underway to conduct another series of seminars in 1962.

Television Section

General - During the year, exploration of the value of television and related electronic techniques and their application to knowledge in the NIH research environment, as well as study of its application to clinical and professional education and communication, has increased the scope of activities in this section. The period was characterized by an increasing potential for service and demands for these services by scientists and research administrators which exceeded our present resources. Presentations of research activities via the Clinical Center WNIH-TV System and the Inter-Medical Television Network have contributed to an intensified interest and leadership in this medium for undergraduate and postgraduate education.

Research - In this area, considerable work was accomplished. A few of the more significant achievements are listed:

1. Flying Spot Scanning Ophthalmoscope - A television Flying Spot Scanning System has been adapted for use with a modified Bausch and Lomb retinal camera. This system is potentially capable of producing high resolution images of the retina under conditions of low light level illumination. Work on the optical transfer system and on the photomultiplier section of the TV scanner is continuing.

2. Vidicon Ophthalmoscope - It has been demonstrated that the small transistorized vidicon camera can be used in conjunction with lenses of appropriate focal length as a TV ophthalmoscope. Through work now being conducted, in collaboration with Bausch and Lomb, on development of a suitable method of illuminating the retina, it is hoped that a compact, relatively inexpensive unit can be constructed for use in teaching and clinical funduscopy.

3. Color Television Ophthalmoscope - Under a joint investigation with the Department of Ophthalmology, WRAMC, color motion picture recordings of retinal pathologies have been undertaken. This study is presently being expanded to include film documentation of retinal burns, as well as animal experimentation with artificially induced lesions. Equipment modifications should result in increased capabilities and usefulness.

4. Color Television Sequential Illuminator - In view of the fact that a large portion of the light available to a Field Sequential TV system is lost in the color filters, it was proposed that the illuminating source be pulsed in sequence - red, blue and green. The timing and sequencing of the light sources will be done optically rather than by electronics. Planning on mechanical construction is in the advanced stage. It is felt that this system will affect a 50-60% gain in light available to the TV camera tube and that this will significantly increase the efficiency of the Color TV Ophthamoscope and the TV Biomicroscope.

5. Remote Operating Room Microscope - The Clinical Director, NINDB, expressed a need for a moderately high power microscope to observe the blood flow in the exposed brain during surgery. One of the requirements was that the microscope be remote from the sterile field to avoid possibility of contamination. A catadioptic astronomical telescope with suitable transfer lens, adapted to the high sensitivity color TV camera, resulted in magnification of from 20 to 30 diameters at a distance of six feet from the brain. Methods of increasing both the available light and magnification are under study.

Engineering - The engineering activities of the Unit fall into two general classifications:

1. Improvements and Extensions of the Clinical Center System - The centralized distribution of synchronizing pulses for the entire Clinical Center was installed early in the year and has operated satisfactorily. Three satellite installations, the Cardiac Catheterization Laboratory; Radiology; and Clinical Pathological Research, are using these pulses to drive their equipment.

Two coaxial cables, installed between the Clinical Center and NNMC early this year, are in daily service at the present time.

The Channel 20 UHF translator was placed in service and a number of experiments in the transmission of signals to points in the Bethesda area were undertaken. A great deal of difficulty was encountered with this equipment. After the passage of several months, the manufacturer finally aligned the equipment satisfactorily.

The Unit purchased some test equipment, other equipment was borrowed. It is our opinion that about $15,000 of additional equipment will be required to keep this Unit in satisfactory operation. Because a satisfactory match between the transmitter and the antenna has not been obtained, additional work will be required to overcome the technical difficulty. It is possible that a new and more expensive antenna may be needed. When this work has been completed, experiments in the transmission of signals to WRAMC and the Department of HEW Building will be resumed. This work has gone slowly because of shortages of manpower and for reasons associated with the unfamiliar and quite complicated UHF technology.

2. Development - The coaxial cables between NIH and Navy were designed to handle broadcast-type RF signals. It occurred to us early in the year that there was a possibility that they could be used to transmit the much higher quality camera-type video signal. The lines, in the frequencies involved, not only lost the larger part of the signal at these frequencies, but also distorted the signals badly. A project was undertaken to design amplifiers that would correct the line losses and compensate for line distortions. This was a significant achievement because it demonstrated that this type of signal could be sent under private lines for more than a mile by the addition of equipment which was not excessively expensive. Navy has built amplifiers following our designs, and is very interested in this development.

The problems related to color television in the new surgical facility have been the subject of much interest this year. Early in the year we concluded that an idea for a new color camera design has sufficient merit to warrant thorough exploration. It seemed to offer the possibility that a hermatically sealed sterilizable camera of very small dimensions could be developed. The design would be inexpensive as compared with available commercial equipment. The fact that such a camera could be safely introduced into the operating environment would solve the optical problems imposed upon cameras that have to be kept external to the operating room. While this undertaking involved the design of a complete system, we felt it was within our capabilities. As expected, we had magnificent support from industry in terms of engineering assistance and access to newly developed camera tubes, etc. Because the design has involved a great deal of work with solid state physics, and in order that the Chief of TV Engineering might obtain assistance and improve his knowledge in this area, a special part time training experience has been planned for him and the training has been requested.

Television Programming Operations

The demand for television services for purposes of education and the dissemination of scientific information continued to exceed the manpower resources of the Unit. The programs produced during the year are listed below:

Compass Courses for NIH Personnel:	Total of two programs
PHS Senior Level Orientation:	Total of four programs
Council on Medical Television:	A series of programs lasting two days
Special Orientation for Clinical and Research Associates:	One program
American Academy of Allergy:	A one hour plus program produced for NIAID. From NIH to Statler-Hilton. Video taped.
NIH Hamsters - "Annie Get Your Gun":	Coverage for patients
"Introduction to Laboratory" for Summer Fellowship and Medical Research Seminars for high school students:	One program. Video taped.
X-Ray Technologists Meeting:	Evening Program
NIH Lecture:	Coverage for overflow crowd.
Conference State and Territorial Dental Directors:	Amplification of detail of two demonstrations made by Division of Dental Public Health and CC Dental Clinic
Combined Clinical Staff Conference (Medical Genetics, Chemotherapy):	Two programs video taped
Second International Congress Neurological Surgery:	One hour plus program - primarily video tape with some live TV vignettes current research NINDB
Re-runs of Video Tapes and Kinescopes:	18 showings of programs previously recorded for visiting groups, professional groups, and internal staff education.
	Two showings of panel discussion by psychiatrists on "Action for Mental Health" originally recorded by commercial network

Fire Prevention Week:	Films via Inter-Med. Network Continuous showing 11:30 - 1:30 for three days
AFIP - Emergency Medical Disaster:	Program via Inter-Med. Network on basic first aid, etc. Shown on two occasions.

The report on the television activities has been intentionally restricted. We plan to review the activities in this area in March, at which time a comprehensive outline of the fiscal year 1963 development program will be proposed.

ATTACHMENT A

The following tabulation is a representation of the Medical Schools from which candidates applied and from which we appointed candidates.

SCHOOL	APPLICANTS	APPOINTEES
Univ. of Arkansas School of Medicine	1	1
College of Medical Evangelists	1	
Univ. of California School of Medicine	2	
Stanford Univ. School of Medicine	2	1
Univ. of Colorado School of Medicine	3	2
Yale Univ. School of Medicine	11	7
Georgetown Univ. School of Medicine	4	2
George Washington Univ. School of Medicine	2	1
Univ. of Miami School of Medicine	2	1
Emory Univ. School of Medicine	1	
Medical College of Georgia	1	1
Chicago Medical School	1	
Northwestern Univ. Medical School	2	1
Stritch School of Medicine	1	
Univ. of Chicago School of Medicine	6	4
Univ. of Illinois College of Medicine	3	2
Indiana Univ. School of Medicine	2	1
Univ. of Kansas School of Medicine	3	1
Univ. of Louisville School of Medicine	1	
Tulane Univ. School of Medicine	1	1
Johns Hopkins Univ. School of Medicine	7	3
Univ. of Maryland School of Medicine	2	
Boston Univ. School of Medicine	2	1
Harvard Medical School	29	17
Tufts Univ. School of Medicine	6	
Univ. of Michigan Medical School	2	2
Univ. of Minnesota Medical School	1	1
Univ. of Mississippi School of Medicine	1	
St. Louis Univ. School of Medicine	2	
Washington Univ. School of Medicine	9	5
Albany Medical College	3	2
Univ. of Buffalo School of Medicine	1	
Albert Einstein College of Medicine	8	7
Columbia Univ. College of P&S	23	14
Cornell Univ. Medical College	9	5
New York Medical College	1	
N.Y.U. College of Medicine	12	7
State Univ. of New York - Downstate	5	1
Univ. of Rochester School of Medicine	5	3
State Univ. of New York - Upstate	3	1
Univ. of North Carolina School of Medicine	2	1
Duke Univ. School of Medicine	8	1
Bowman Gray School of Medicine	2	
Western Reserve Univ. School of Medicine	6	5
Ohio State Univ. College of Medicine	1	1
Univ. of Oregon Medical School	3	

SCHOOL	APPLICANTS	APPOINTEES
Jefferson Medical College	2	1
Univ. of Pennsylvania School of Medicine	8	4
Univ. of Pittsburgh School of Medicine	2	1
Univ. of Tennessee College of Medicine	1	
Vanderbilt Univ. School of Medicine	3	1
Baylor Univ. College of Medicine	6	3
Univ. of Tush School of Medicine	1	1
Univ. of Vermont College of Medicine	1	
Medical College of Virginia	2	
Univ. of Washington School of Medicine	2	2
Univ. of Wisconsin Medical School	1	
Seton Hall	2	
McGill University	1	

The following tabulation is a representation of Hospitals at which candidates and appointees served their internships and residencies.

	INTERNSHIP		RESIDENCY	
HOSPITAL	APPLIED	APPOINTED	APPLIED	APPOINTED
Univ. of Arkansas Hospital			1	1
Los Angeles County General	4	3		
Palo Alto-Stanford Hospitals	2	1	1	2
Univ. of California Hospital at L.A.	4	3	1	0
Univ. of California Hospital at S.F.	4	2	0	2
Univ. of Colorado Hospital	2	1	1	0
Grace New Havan Hospital	11	5	5	5
West Haven VA Hospital	0	0	1	3
D. C. General Hospital	1	0	0	1
Georgetown Univ. Hospital	1	1	0	0
Mt. Alto VA Hospital			0	1
Univ. of Florida Hospital	1	1		1
Univ. of Chicago Clinics	3	2	3	5
Chicago Wesley Memorial	1			
St. Francis Hospital	1	1		
Univ. of Illinois Res.& Education Hosp.	2	1		
Bobs Roberts Memorial Hospital	1	1		
Indiana Univ. Medical Center	1			
Univ. of Iowa Hospital	1			
Charity Hospital			1	1
Baltimore City Hospital	2			
Johns Hopkins Hospital	13	7	2	7
University Hospital	2		1	
Beth Israel, Boston	5	2	3	2
Boston City Hospital	11	5	3	5
Boston Lying-In Hospital			1	1
Childrens' Medical Center	1	1	2	1
The Lahey Clinics			1	1
McLean Hospital				1
Massachusetts General Hospital	17	14	7	11
Massachusetts Memorial	4	1	2	
Massachusetts Mental Health Center			2	10

HOSPITAL	INTERNSHIP		RESIDENCY	
	APPLIED	APPOINTED	APPLIED	APPOINTED
New England Center Hospital	2	2	2	1
Peter Bent Brigham	11	5	5	6
Henry Ford Hospital			1	
Univ. of Michigan Hospital	4	3	4	3
Univ. of Minnesota Hospital	1	1		1
Barnes Hospital	12	6	3	7
Mary Hitchcock Hospital	1			1
Jersey City Medical Center			1	
Bellevue Hospital	20	8	8	8
Beth-El, Brooklyn	2	1		
Bronx Municipal Hospital Center	4	2	1	1
Bronx VA Hospital			1	1
Brooklyn Jewish Hospital	2	1	1	1
Buffalo General	1			
Kings County	3		1	
Memorial Center			1	1
Montefiore Hospital	5	4	3	1
Mount Sinai Hospital	1	1	1	1
New York Hospital	10	4	4	4
New York State Psychiatric Hospital				2
PHS Hospital, Staten Island	1	1		
Presbyterian Hospital	14	10	2	12
Roosvelt Hospital	1	1		
St. Lukes	3	1	2	1
Strong Memorial Hospital	5	1	4	2
Rockefeller Institute			1	2
Duke University Hospital	13	8	4	4
North Carolina Memorial	4	3	1	1
Cleveland Metropolitan General Hospital	1	1		
Good Samaritan	1			
University Hospitals, Western Reserve	7	1	5	1
University of Oklahoma	1			
University of Oregon Hospital	1			1
Univ. of Pennsylvania Hospital	12	4	4	4
Jefferson Hospital	1	1		
Philadelphia General	1			
University of Pittsburgh	1		1	
Temple University Hospital			1	1
Medical College South Carolina Hospital	1	1	1	1
Vanderbilt University Hospital	3	1	2	1
Baylor University Hospital			1	1
Herman Hospital	1	1		
Jefferson Davis Hospital			1	1
Parkland Memorial Hospital	1	1	1	1
Mary Fletcher	2		2	
University of Virginia Hospital	3	1	2	1
King County Hospital	1			
Univ. of Wisconsin Hospital	1	1		1
Montreal Neurological Institute			1	1
Gorgas Hospital, Panama Canal Zone	1			

ATTACHMENT B

SCHEDULE CLINICAL & RESEARCH ASSOCIATE MATCHING PROGRAM
for Calendar Year 1962

January & February	Preparation of Packet Materials and Applications
March, April, May, June, July, August	Receipt & Processing of Applications
Sept. 15	Final date for sending applications to candidates
Sept. 21	Deadline for receipt of completed applications
Sept. 24 to Oct. 5	Review of applications by Institutes
Oct. 8 to 26	Interviews
Oct. 26 to 31	Selection of appointees by Institutes
Nov. 1	Matching
Nov. 2	Institutes notified of results of matching
Nov. 5	Inter-Institute negotiations and final approval of matching results
Nov. 6	Notification of successful candidates for confirmation of appointment
Nov. 7 to 9	Notification of all candidates by letter; Release of unsuccessful candidates for recruiting by other programs; Notification of Division of Personnel, OSG, regarding action taken on candidates.
Nov. 12	Mailing of CORD forms; Follow up on candidates.

CLINICAL AND RESEARCH ASSOCIATE "MATCHING PROGRAM"

Operational Procedures For Institutes

The National Institutes of Health Clinical and Research Associate "Matching Program" came into being to meet a variety of problems and needs. Its most important elements are:

1. It provides an orderly, systematic method whereby the Institutes can appoint and defer future junior staff memberw without inter-Institute conflicts and with the assurance that our relations with young professional people will be on a dignified, fair, competitive basis.

2. It provides a method whereby candidates for opportunities at NIH can be actively recruited for other positions in the Public Health Service in the event they do not qualify or are not selected for appointment here.

3. It is designed to minimize unproductive processing of applicants and the consequent waste of NIH and Division of Commissioned Officer Personnel staff time.

PROCEDURES FOR OPERATION OF THE PROGRAM

I. Inquiries

Inquiries reach this office from many sources. These include Office of the Director, NIH; Director, Clinical Center; Office of the Surgeon General; Clinical Directors; Scientific Directors; Laboratory Chiefs.

II. Actions Taken On Inquiries

A. Candidates in which NIH is not interested are sent the following:

1. Letter outlining requirements for appointment at NIH and stating candidate does not qualify on one or more points.

2. Letter discouraging applicant who minimaly qualifies but will not successfully compete (candidate is advised of other opportunities in the PHS).

B. Candidates of definite interest to NIH:

1. Inquiries may be answered directly by Clinical or Scientific Directors if they so desire, or them may be forwarded to this office for reply.

2. If inquiries are answered by the Institutes it is requested that a copy be sent to this office, so that a file card may be established. As candidates may apply to several Institutes simultaneously, the above is very important to avoid duplication and to maintain continuity.

3. All "Matching Program Packets" are mailed by this office rather than the Institutes.

4. A file card is established for every inquiry received.

5. All candidates for the Clinical & Research Associate programs will be required to complete the various information sheets contained in the Packet.

III. Actions Taken on Information Sheets (applications) Received

A. Upon receipt of the completed information sheets a file is established for each candidate.

B. When the file is complete, i.e., letters of references (3), and grade transcripts, the material is photocopied and sent to each of the Institutes to which the candidate has indicated he would like to apply. A copy of the file is also sent to the Division of Personnel, PHS.

C. Attached to each candidate's file is a route slip asking for your action on the candidate; i.e., reject or arrange interview. This route slip when marked with your action is returned to this office.

D. An additional letter of reference will be requested from the "Chief of Service" of the candidate if he has not already submitted one.

E. Photographs and Grade Transcripts will not be duplicated with the files, but will be maintained in a master file in this office. They will be sent to the Institutes on loan upon request.

F. Final date for sending applications to candidates, September 15, 1962.

G. Deadline for receipt of completed applications is September 21, 1962.

IV. Interviews

A. All interviews are by invitation only. By direction of the Clinical and Scientific Directors all interviews are to be arranged by this office.

B. All candidates will be notified by this office the date of their interviews and the Institutes who wish to interview them.

C. All interviews will be held during the three week period October 8 thru October 26, 1962.

D. All persons in the Institutes who will be interviewing candidates will be asked to inform this office the days of the week and the hours when they will be available during the above three week

interview period.

E. One half hour is allowed for each interview.

F. Each person interviewing candidates will be sent a weekly interview schedule marked off in half-hour blocks for each day. As interviews are arranged you will receive a memorandum giving candidate's name, date of interview and time. Please be sure that this information is put on the weekly schedule.

G. Each candidate will be given a detailed interview schedule listing time, Institute, Interviewer and location of interview, when he reports to this office the day of his interview.

H. If you desire to have a candidate interviewed by another person within your Institute, please check his schedule before making arrangements.

I. If you think a candidate should be interviewed by a person or persons in another Institute, please check with Miss Long before making these arrangements. This is nedessary because: The candidate may have applied to this Institute; his file will have been reviewed by persons in this Institute; if the Institute is not listed on his interview schedule it means they are not interested in a person with his background and qualifications. If you still feel that the candidate should be seen, please make arrangements through the Clinical or Scientific Director of the Institute.

J. No candidate is to be offered a position at the time of interviews.

K. When the candidate has completed his interviews he will fill out a rank order sheet listing Institute and Laboratory of Section, if this is necessary, within the Institute. This is a confidential statement.

V. Selection, Matching and Notification of Appointees

A. By October 31, Institutes will submit to this office in writing, a rank order list of the candidates they wish to appoint. This list should contain at least twice the number of candidates needed for your positions.

B. The rank order lists of the Institutes will be matched with the candidates rank order sheets.

C. On November 2, Institutes will be notified by telephone of the results of the matching.

D. If an Institute has chosen a candidate for appointment and the candidate has not listed the Institute, or Section within an Institute, on his rank order list and has not been selected by

one he did list, the Institute will be given this information and two courses of action may be taken:

1. The Institute can select another appointee.

2. The Institute may offer the position to the candidate to see if he is interested and will accept.

E. On November 6, the Institutes will, by telephone, offer their appointees the positions for which they were selected (subject to approval of their nomination for CORD deferment if this is involved), and ask for a verbal acceptance. As the Institutes wish, the telephone call may be followed up with a letter of appointment or not.

F. If an "appointment letter" is <u>not</u> to be written, at the time of the telephone call the Institutes should ask for a letter of acceptance from the candidate.

G. If an "appointment letter" is written, the acceptance letter can be requested at that time.

H. Two copies of the appointment and acceptance letter on each appointee should be sent to this office.

I. Rejection letters to all unsuccessful candidates will be mailed on November 9.

J. On November 12, applications for deferment will be mailed to all successful candidates.

January 15, 1962
Clinical & Professional Education

Calendar Year 1961

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

PATIENT ACTIVITY SECTION

CC:05
Serial No.

The Patient Activity Section comprises the following services to patients of the Clinical Center: Recreation, Patients' Library, and the Gray Lady Service of the Montgomery County Chapter of the American Red Cross. The recreation program offers a diversified, patient-centered activity program, utilizing the various 14th floor recreation areas of the Clinical Center, outdoor areas within the reservation, as well as selected community resources. The primary purpose of this program is to provide medically approved recreation services to the research patients of the Clinical Center of the National Institutes of Health. The Patients' Library provides recreational reading material, mechanical reading aids for patients, advisory reference and patients' bedside services. It also conducts group reading sessions, story hours and literary programs. The Gray Lady Service provides a patient-centered program designed to supplement those activities not provided for by the NIH staff, such as letter writing, shopping, escort service and other ancillary duties.

RECREATION

Recreation service to patients within a hospital setting is based upon the conviction that recreation is helpful in sustaining and cultivating morale favorable to research, treatment, and in developing human capacities. Many patients have a considerable amount of leisure time in the hospital. Failure to provide for constructive use of this time can result in its being a demoralizing factor, whereas, the provision of opportunities to participate in recreation activities suited to the mental, emotional, physical, and social capabilities of the individual assists in producing a healthy and optimistic outlook. Although some patients have personal recreation resources, the ma[jority] need leadership and guidance in finding activities that provide a recreation outlet for them.

The importance of a patient-centered recreation or leisure-time pro[gram] being recognized by the administration of the Clinical Center, a full scale activity schedule was initiated to meet this important need. As organized under the guidance of a Hospital Recreation Specialist, the present recreati[on] program is designed to meet the needs of the largest majority of patients; that is, a program emphasizing the semi-active and/or passive forms of [activity]. Within this program, all facets of recreation are made available to t[he patient] and are modified as to meet the abilities and disabilities of the individual concerned.

A brief description of some of the "new" activities and programs incorporated into the patient recreation program is presented for clarification:

14th FLOOR RECREATION AREA PROGRAM

The Patient Activity Section, the nursing staff, and the patients felt that the word "gymnasium" was deceiving as to its proper function within our research setting; as a result, a new concept of the use of this area was formulated and advocated by all concerned. Within this new area and programming concept, semi-active and/or passive forms of recreation are emphasized and modified to suit the abilities and disabilities of the individual concerned. In order to emphasize this program, both to patients and personnel, and to accentuate the changed use of this area, patients are now referred to recreation via SF-513, "Clinical Record - Consultation Sheet." The attending physician is asked to fill out the Consultation Sheet, stating whether he wishes his patient to participate in active, semi-active, and/or passive forms of recreation. This, with the Patient Activity Section "Recreation Referral and Interest Sheet," is completed and forwarded to the Patient Activity Section office. This program is conducted Monday through Friday, between 2:30 and 4:30 p.m., and is designed for medically cleared patients 10 years of age and older, including geriatric patients. At this time, 103 patients are on referral, and 53% of the total visit the area an average of 5.5 times during the month.

RECREATION SPECIALTY NIGHT

This program is held in the 14th Floor Recreation Area between 6:30 and 9:00 p.m. and is designed to meet the leisure-time needs of those patients, particularly Normal Volunteers, who are capable of active forms of recreation. Specialized adapted sports activity is emphasized.

HOBBY SHOWS

With the inclusion of a Hobby Crafts program in the planned recreation activities, Hobby Shows were held periodically throughout the year. These shows were held in the Anteroom, 14th Floor Assembly Hall. Items displayed were prepared by patients during scheduled hobby craft periods.

WEEKEND ACTIVITY

One of the major recreation needs, as expressed by the nursing staff and the patients, was an activity program for weekends, either Saturday or Sunday. In order to meet this need, a Saturday afternoon program was initiated to supplement the already scheduled evening movie. The program is held in the 14th Floor Recreation Area, between 1:30 and 4:30 p.m. and includes the "Arm-Chair Travel Club," the "NIH Social Hour," and "The Game Club."

Arm-Chair Travel Club

Foriegn embassies are invited to speak informally to the patients about their countries. Audio-visual aids are utilized.

NIH Social Hour

This activity is designed to integrate and initiate active socialization among the patient groups. Social mixers, community sings, and social dancing are some of the featured activities.

The Game Club

Various semi-active and passive forms of recreation are emphasized; this activity is designed primarily for the children's patient population.

The Arm-Chair Travel Club and the NIH Social Hour are held on alternate Saturday afternoons, with The Game Club supplementing the afternoon's program every weekend.

OFF RESERVATION ACTIVITY

This program includes securing permission for the patients, both Normal Volunteers and ambulatory patients, to attend such events as lectures, baseball games (Senators), sightseeing trips, plays (Olney Theatre, Carter Baron Amphitheatre, Catholic University Theatre), football games (Redskins, George Washington University), and concerts.

BAND CONCERTS AND VARIETY SHOWS

With the cooperation of the bands of the Army, Navy, Marine Corps, and Air Force, a series of band concerts was initiated. During the summer, three outdoor concerts were scheduled, weather permitting, in the early evening on the patio east of the 1st Floor Auditorium. The remainder of the fall-winter concert series are being held in the 1st Floor Auditorium. The Armed Forces, along with such groups as the American Guild of Variety Artists, Elks, Scottish Rite Masons, and the American Federation of Musicians, have considerably improved the quality of talent presented during the scheduled variety shows.

NORMAL VOLUNTEERS, NURSING UNIT 11-East

This group, composed of volunteers from the Bureau of Prisons, is entirely dependent upon the recreation program for their leisure time activity. Being isolated within their research study area, planned activity is limited to a hobby crafts program and a one hour daily visit to the 14th Floor Recreation Area. These activities are supplemented by an occasional walk on the reservation. It is hoped that a more diversified recreation program can be planned for this group.

CHILDREN'S RECREATION PROGRAM

Throughout the summer months, a swimming pool program for children was held on the 14th Floor Sundeck - westside; however, due to inadequate staff an overall, planned recreation program for children was curtailed. Play [illegible] and a play area were made available to the children in the 14th Floor Recreation Area, and creative guidance by a staff member was provided. With the recent hiring of a Children's Recreation Program Leader, it is anticipated that the program will be in full swing within a few months.

EXPERIENCE ASSIGNMENTS OF NORMAL VOLUNTEERS

The Patient Activity Section secures career development assignments for all Normal Volunteers who care to participate in offices and laboratories throughout the NIH reservation. An average of 25 Normal Volunteers are continuously on assignment.

SEASONAL PROGRAMS

Throughout the year, holidays and seasons are emphasized within the various recreation programs. Special recreation programs were planned in the 14th Floor Recreation Area on Memorial Day, Veteran's Day, and Independence Day, with parties and dances scheduled for Halloween and Thanksgiving. Of course, the Christmas-New Year season is one of the major recreation programs of the year, with a variety of active and passive programs being scheduled.

The 14th Floor Recreation Area is utilized, Monday through Saturday, between 10:00 a.m. and noon by the National Institute of Mental Health. This Section supplies the Mental Health Units with equipment necessary to carry out their recreation program. It does not, however, direct or supervise the National Institute of Mental Health recreation program, but frequently assists at their request.

The NIH Recreation and Welfare Association reserves the 14th Floor gymnasium for use of employees between the hours of 5:00 and 9:00 p.m. Unless specifically reserved, the remaining evening hours are available to the Patient Activity Section and the National Institute of Mental Health.

During the past year, a form of "censorship" has been imposed upon the selection of motion pictures shown to the patients. This occurred as a result of patient and personnel complaints that some of the movies shown were too "adult" and not suitable for presentation. Clinical Center patients represent a great spectrum of intellectual, chronological, medical, social, and cultural differences; as a result, it is very difficult to find an activity which will reach them all. Suitable motion pictures are, therefore, the best common denominator in the field of patient recreation. We owe it to the patient to bring to him the most up-to-date and entertaining movies that can be had. As a result, the Patient Activity Section will continue to try its best to select motion pictures of the highest calibre; however, we are finding it more and more difficult to select films within this range as the present trend in movie making is toward the realistic theme. In coping with this "censorship" problem, the Patient Activity Section will continue its present policy of trying to find the "happy medium" in the selection of its motion pictures.

The new recreation program, as presently formulated, has been accepted with "open arms" by both patients and personnel, and this is extremely encouraging. Patient interest and response to the planned program is becoming much stronger, with their realization of and education toward the value of such a program. This is evidenced by the fact that patients are responding more to various forms of active recreation as opposed to their almost completely passive participation in the past. The monthly statistics have shown a gradual rise in active patient participation. The support and cooperation given to the recreation program by the various hospital disciplines, particularly the Nursing

Service, have been important factors in its success. What we achieve depends in great degree upon the interest and support of the entire Clinical Center staff. This section is always happy to find support for its efforts and is sincerely grateful to all who cooperate with it.

I. SECTION OBJECTIVES:

1. General

A. To provide, during the leisure time of patients, recreation opportunities that meet their interest and needs within their medical limitations, and to contribute to their adjustment to hospitalization and medical treatment.

B. To assist patients in the redirection of their recreation interests and pursuits when such redirection is indicated by medical limitations; and to encourage continuation of these interests and pursuits following hospitalization.

C. To assist patients to have fully enjoyable experiences, both in social groups and individually.

D. To encourage the broadest possible voluntary participation in recreation that is consistent with the medical research program.

E. Inclusion and involvement of the patient in recreation planning.

F. Encouragement of the development of leadership from within the patient group, and the utilization of patient leadership in the conduct of the program.

2. Specific

A. Greater active patient participation.

B. Establishment of a program designed to meet the recreation or leisure-time needs of confined or bed-ridden patients.

C. Greater utilization of Gray Lady Volunteers within the various programs.

D. More effective communication with our various sections, as well as with other hospital disciplines.

E. Establishment of a series of "In-Service Training Classes" for the recreation staff.

PATIENTS' LIBRARY

READING CAN HELP THE ILL

In a recent article, "Reading as Therapy",[1] Dr. Karl Menninger said, "A doctor who is merely treating disease will see the library full of medical reference books. The doctor who is treating the patient will think of the library as also containing many things needed by the patient to inform him, assist him, comfort him, inspire him, amuse him..."

In the seven and a half years of the existence of the NIH Patients' Library, the staff has worked to develop a service which will offer the patients reading material to inform, assist, comfort, inspire, and amuse them. A basic program aimed at reaching each patient at least once a week has been set up as a minimum of service. With this as a base, the staff endeavors to fulfill its role on the therapeutic team of the Clinical Center. Frequently this role calls for short term projects such as giving special attention to individuals or small groups to help them over periods of low morale caused by loneliness, forced inactivity, anxiety over their condition, or worry over problems at home. Doctors, nurses, social workers, as well as chaplains, occupational therapists, physical therapists, recreation workers, Gray Ladies or family members sometimes call on the library for special services for patients. Just as often the librarians discover these needs themselves and consult the medical staff as to its plans for certain patients. Dr. Menninger, to quote him again, ends his article by referring to the services of hospital librarians as "daily, patient, unobtrusive work of incalculable value," and expresses the hope that his remarks will "encourage them to carry on this important function in maintaining the total therapeutic effectiveness of the hospital..."[2] The library staff members try to maintain a sense of their "important function" while carrying out their duties in an "unobtrusive manner." They have learned that their services, while appreciated, are only too often taken for granted. Even so, occasional comments are heart-warming and encouraging.

I. OBJECTIVES OF PATIENTS' LIBRARY:

Briefly stated, the objective of the Patients' Library is "to furnish reading materials for all patients, for the purpose of contributing to their recovery and welfare."[3] The Veterans Administration elaborates on this purpose in its manual, "Library Service,"[4] stating that the ultimate aim of library service is to assist the medical staff in the rehabilitation of the patient and spelling out the aims of direct library service to patients as follows:

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1. Menninger, Karl, M. D. "Reading as Therapy" in ALA Bulletin 55:3-6, April, 1961.

2. Ibid.

3. Tews, Ruth M. "The Patients' Library" in Keys, Thomas E. Applied Medical Library Practice. pp. 97-134.

4. Veterans Administration Manual M6-5 "Library Service"

1. Adjuvant

   A. To aid recovery through the dissipation of idleness, the contentment of mind, and the assistance in psychological adjustments on the part of the patient.

   B. To participate in programs using books as part of the total therapy when medically directed.

   C. To contribute to physical and emotional relaxation.

   D. To minimize the patient's concern with his hospitalization.

2. Educational

   A. To meet individual patient's needs for educational improvement.

   B. To aid in developing latent interests.

   C. To stimulate and develop good reading habits.

   D. To enrich cultural backgrounds.

3. Social

   A. To help the patient adjust to new working or living conditions.

   B. To contribute to development as individuals and citizens.

4. Personal

   A. To carry out the library's unique mission in the hospital, enabling the patient to find personal privacy in his institutional living.

BASIC PROGRAM OF THE PATIENTS' LIBRARY

The following services are regularly given from the Patients' Library:

1. Regularly scheduled weekly bookcart visits to all units, except Mental Health whose patients are invited to come to the library for their books and other materials.

   A. Books, periodicals, Talking Books, and other materials are selected, keeping in mind the needs and interests of the patients on the unit to be visited. The librarian is guided by a record of material already borrowed by the patient, by notes in the reading interest and special request file maintained for each unit, as well as by information obtained from attendance at meetings and discussions with members of the staff.

B. The bookcart visits are supplemented by delivery of material requested as soon as it is available. A reserve or request file is maintained in the library.

C. Reference questions are recorded and answers furnished as soon as possible.

D. Individual reader's guidance is given, especially for long-term patients.

E. Where there are several children on a unit, the library usually schedules separate bookcart visits for them. The librarian takes time to give individual attention to each child, to teach him how to use a library and how to select books for himself. Reading or story-telling to individual children or small groups in a regular part of the bookcart visit.

F. Mechanical reading aids such as the projected book machines, reading stands, bed-specs, magnifying glasses and the automatic page turner are provided as needed.

2. Deliveries of additional material to patients: new magazines and special requests are delivered to each unit on Friday afternoons.

3. Services and Activities in the library

A. The Patients' Library is open to patients and their visitors from 8:30 a.m. to 5:00 p.m., Monday through Friday.

B. Reader's advisory guidance and reference service is given to those who visit the library.

C. Reading aids are often demonstrated to patients and to visitors touring the Clinical Center.

D. Story hours are sometimes conducted in the library for small groups of children brought by the Social Worker or other staff member.

E. Reading or discussion groups for adults are occasionally scheduled for evening hours in the library.

4. Reading Group Program

A. Reading groups on Mental Health units are a regular part of the library program. For about seven years, a weekly session has been conducted by the librarian on one unit. On other units, the group program depends upon the interest of the patients and the staff and upon the library's ability to take charge. At this writing there is a newly organized reading-discussion group on a second Mental Health unit.

B. Occasionally group programs are conducted for patients on medical units. The library has been informally requested to start such a program for a group of metabolic balance study patients but has been unable to assume this task because of inadequate staff.

C. For four months during 1961, a literary program known as "Booklovers' Get-Together" was held for all interested patients and their visitors.

LIBRARIAN'S RESPONSIBILITY:

Basic to the operation of an effective program of service to patients is the maintenance of a "live" collection of reading materials, and reading aids. Selection is a primary responsibility of the librarian. This includes selection and acquisition of new materials and weeding out and discarding what is obsolete, worn-out or little used.

A second duty is the continuous training and supervision of the staff, especially of the volunteer workers--both Gray Ladies and patients. Perhaps orientation of Nursing Department personnel should also be mentioned since it is so important in helping the librarians give the best possible service to all the patients.

Calendar Year 1961

PUBLIC HEALTH SERVICE — NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER
OFFICE OF THE DIRECTOR

DEPARTMENT OF SPIRITUAL MINISTRY — CC-09 Serial No.

PROTESTANT CHAPLAINCY

Comparative Three Month Statistics of Full-Time Chaplains

I. CANCER UNITS (13-E, 12-W, 2-E)	Andrew (Jul.Sept.Nov.)	Veith (Jul.Sept.Nov)	White (Apr. May,June)
Total Pateints in Hospital (for whom Chaplain is responsible)	1,620	438	219
Total Patients on 3 Cancer Units	262	72	219
(A) Patients Seen	142	72	180
% Seen	54%	100	82%
(B) Total Contacts	579	808	2,679
Contacts per patient (per month)	4.1	11.2	14.9
Pastoral only	4.07	5.0	14.8
Sacrament only	.007	6.2	.07
Contacts per total population (3 nursing units)	2.2	11.2	12.4

II. HEART UNIT 8 EAST	Andrew (Apr.May,June)	Veith (Jul.Sept.Nov.)	White (Jul.Sept.Nov.)
Total Patients in Hospital (for whom Chaplain is responsible)	1,375	438	*123
Total patients on 8 East	125	42	97
(A) Patients Seen	55	42	71
% Seen	44%	100	72%
(B) Total Contacts	364	321	1,732
Contacts per patient(per month)	6.6	7.6	24.4
Pastoral only	6.6	3.5	24.4
Sacrament only	0.0	4.1	0.0
Contacts per total population (8-East nursing unit)	2.8	7.6	17.8

* 26 of this number are cancer patients for whom Chaplain White had continuing responsibility.

Comment on Statistics

Now that Chaplain White has demonstrated an intensive pastoral ministry on two different services, Cancer and Heart, two statistical comparisons with Chaplain Andrew's emergency ministry stand out as having significance:

(A) Comparing the "Patients Seen" and "% Seen" by Chaplains Andrew and White on both Cancer and Heart services, there is an increase of 27% (Cancer units) and 28% (Heart unit) in the number of patients seen by Mr. White.

(B) Comparing the "Total Contacts" and "Contacts per Patient" of the two chaplains, there is an increase of 363% (Cancer), and 376% (Heart), in the number of contacts per patient made by Mr. White over Mr. Andrew.

The consistency of these significant percentage increases makes one conclusion fairly certain. Namely, when a quality of ministry is provided that makes possible the development of good pastoral relationships with all patients desiring spiritual care there results not only, (a) a significant increase (27-28%) in the number of patients who avail themselves of the chaplain's services, but also, (b) a marked increase (363-376%) in the amount of pastoral work per patient. This increased use of the chaplain's services is the result, not only of his increased availability to patients, but is also due to the relationships he is able to develop with patient-care staff, from which they learn to make greater and more intelligent use of his services.

The comparative statistics from Father Veith's ministry are included fo one purpose, namely, to point up the sacramental emphasis (65%) of the Roman Catholic ministry, as contrasted to the almost total Protestant emphasis on developing pastoral relationships. The latter are, of course, more time-consuming per unit.

Statistics for the nine months, March - November, reveal the following figures:

A. Pastoral Contacts	Per Patient Seen (per month)	Per Total Population (per month)
Protestant	7.7	2.5
Catholic	2.6	2.5
Jewish	1.3	1.0

B. Sacramental Contacts	Per Patient Seen (per month)	Per Total Population (per month)
Protestant	.07	.02
Catholic	4.9	4.7

Report of Chaplain's Activities For Period March thru November, 1961*:

1. CHAPEL SERVICES	CATHOLIC	PROTESTANT	JEWISH
Services	279	41	28
Attendance	7,614	3,201	112
Sermons	39	39	27
Devotions	43		
Attendance	1,101		

II. ADMINISTRATION OF SACRAMENTS			
Holy Communion	279	94	
Chapel	3,153	537	
Bedside	5,302	112	
Confessions	786		
Chapel	113		
Bedside	673		
Baptisms	6	1	
Confirmations	3		
Last Rites	50		

III. PASTORAL MINISTRY			
Initial Interviews	467	665	126
Surgery	322	1,130	15
Seriously Ill	954	1,845	36
Counseling	829	2,362	106
Rounds	3,405	1,623	206
Relatives	549	4,386	63
Instructions	15		
Deaths	39	70	4
Funerals	7		
Post-Discharge	86	19	
Wedding		1	

IV. PATIENT REFERRALS				
Doctors	(2)	251	41	4
Nurses	(2)	599	536	3
Social Workers		45	122	3
Family		330	51	11
Self		185	39	
Clergy		48	37	
Other		42	44	1

*(1) This report does not include a complete year because these report forms were not worked out until March.

(2) Included in these figures are individual "conferences" with staff, which belong in next section, V. Staff Relations, Conferences.

V. STAFF RELATIONS	CATHOLIC	PROTESTANT	JEWISH
Conferences	(3)	2,528	
Staff Meetings		42	
Lectures, Etc.	11	13	
Counseling	310	34	
VI. COMMUNITY AND PROFESSIONAL RELATIONS			
Addresses		6	
Meetings	3	16	
Worship	10		
Sermons	3		
Ecclestiastical Conferences	2		
Professional Conferences	2	4	
Clergy Consultations		18	
VII. ADMINISTRATION			
Correspondence	147	209	5
Staff Meetings	7	12	1
Conferences		552	1
Planning (Hrs.)	7	456½	
Preparation and Study (Hrs.)	68	282	
Records & Reports (Hrs.)	32	100½	
VIII. RESEARCH & TRAINING (Hrs.)			
Planning		60½	
Recording		24½	
Analyzing		71½	
Reports		42	
Consultation			
Seminars, Courses, Lectures			
Research Study		19	
IX. OVERTIME (Hrs.)	226	189-3/4	

(3) Father Veith's individual conferences with Staff are included in IV. Patient Referral above.

Report Of Research Project In Pastoral Care

Part A

Project Title: A survey of Pastoral Needs and Problems of Clinical Center Patients and their attending families encountered.

Principle Investigator: Chaplain Robert I. White, Research Associate

Other Investigators: Chaplain William R. Andrew, Supervisory Chaplain
James E. Dittes, PhD, Yale Divinity School, Research Consultant

Cooperating Units: None

Man Years:
Total: 1-3/4
Professional: 1-1/6
Other: 7/12

Projection Description:

Methods Employed: A participant-observer approach in which the chaplain develops pastoral relationships as intensively as is appropriate in the Clinical Center setting, observes the spiritual needs and problems which become apparent in intensive pastoral care, and what is involved in ministering to these needs and problems. Four to six months will be spent on representative nursing units of each service.

Patient Material: 198 patients admitted to NCI and NHI.

Major Findings: Our preliminary findings suggest that greater involvement with families of patients results in the Clinical Center than in the usual general hospital for the following reasons: patients here are either chronically or terminally ill; the extended length of hospitalization of patients; and more financial aid is available to enable relatives to be present for long periods. This means that time and often distance separate them from the spiritual resources of their home church and friends. A more intensive pastoral care than might be appropriate in a general hospital is needed to minister adequately to patients in this kind of setting.

Significance, etc.: Primarily this survey is intended to aid the Department of Spiritual Ministry in determining what is an adequate quality ministry in the Clinical Center. We know of no such studies elsewhere so the findings of the completed survey may be pertinent to other existent or future clinical research centers or hospitals for the chronically ill.

Proposed Course of the Project: The research chaplain for the next year and a half will minister to patients for 4-6 months on representative nursing units of the various Institutes.

Part B Included: Yes _____ No X

CATHOLIC CHAPLAIN

I. The religious needs of the Catholic patients at the Clinical Center are provided for by one Catholic Chaplain on full-time duty.

Services provided for by the Catholic Chaplain at the Clinical Center are summarized below in a general manner followed by a detailed summation of daily activities for the calendar year 1961.

The Catholic patient census continues to maintain an average of twenty percent of the total patient census, which amounts to an average of 75 to 80 patients. This number of patients requires the Catholic Chaplain to spend sixty hours a week to fulfill his duties properly.

Personnel continue to make demands on the Chaplain's time for personal appointments, but these demands must necessarily be subordinated to the needs of the patients. As a result, only about fifty percent of the personnel request are satisfied. The Catholic Chaplain continues to refer these personnel to their own clergymen in the community whenever possible.

During the past year a small Blessed Sacrament Chapel was opened. The purpose of this Chapel is to provide a suitable place for the reservation of the Blessed Sacrament. The Blessed Sacrament (Holy Eucharist), according to Catholic worship, must be reserved in a Chapel used exclusively for Catholic worship. Under normal circumstances, this Sacrament is administered to Catholics only during their attendance at Mass. However, it is also administered to an individual Catholic, outside of the time of Mass, at his bedside during illness and as a part of the Last Rites of the Catholic Church. If there is no such place in the hospital to reserve the Blessed Sacrament for such occasions, it is necessary for the Chaplain to go out to one of the Catholic Churches in the community to obtain it. A further need is filled by such a Chapel, since it is a custom of Catholics to make visits of devotion to the Blessed Sacrament in its place of reservation. Since its opening, the Catholic patients have been most appreciative of this Chapel for this latter purpose and visit there daily. This Chapel is located in the room next to the Catholic Chaplain's office.

There is nothing else in the way of new projects of special interest to add to this report. The Catholic Chaplain's time is consumed in a normal routine of duties as summarized and detailed below.

II. General Summary Of Services Provided By The Catholic Chaplain

1. Divine Worship Service (Mass) for patients, relatives and personnel daily. (Two services on all Sundays and Holydays).

2. Special religious services daily during months of May and October.

3. Special religious services during seasons of Advent and Lent.

4. Sacraments administered to patients daily.

5. All patients visited each Saturday for confession.

6. Seriously-ill patients visited every day.

7. Weekly consultations with families of patients.

8. All patients visited on regular schedule for counseling.

9. Consultations with Medical, Nursing and Social Service Staffs regarding welfare and rehabilitation of patients.

10. Participation in Orientation program of all new Nursing and Social Service personnel.

11. Participation in programs of Patient Activity Department.

12. Participation in Gray Lady Training Program.

13. Consultation with personnel on request.

14. On call for emergency service twenty-four hours a day.

III. Detailed Summation Of Daily Activities

I. CHAPEL SERVICES

Masses	377
Attendance	10,502
Sermons	57
Devotions	53
Attendance	1,637

II. ADMINISTRATION OF SACRAMENTS

Holy Communion	377
Chapel	4,381
Bedside	7,153
Confessions	1,106
Chapel	138
Bedside	968
Baptisms	6
Confirmations	3
Last Rites	65

II. PASTORAL MINISTRY

Initial Interviews	604
Surgery (visits)	396
Seriously Ill (visits)	1,371
Counseling	1,113
Rounds (wards visited)	4,619
Relatives	658
Instructions	14
Deaths	54
Funerals	1
Post Discharge	117

IV. PATIENT REFERRALS

Doctors	343
Nurses	804
Social Workers	65
Family	375
Self	197
Clergy	76
Other	65

V. STAFF RELATIONS

Conferences	
Staff Meetings	
Lectures	12
Counseling	457

VI. COMMUNITY & PROFESSIONAL RELATIONS

Addresses	5
Meetings	3
Worship	5
Sermons	
Ecclesiastical Conf.	
Professional Conf.	4

VII. ADMINISTRATION

Correspondence	194
Staff Meetings	10
Planning (hours)	19
Preparation and Study (hours)	110
Reports & Records (hours)	41
Conferences	

JEWISH CHAPLAIN

Jewish chaplaincy service is on a contract basis providing for twelve visits per month. Rabbi Joseph M. Brandriss has been serving as Jewish Chaplain since November 27, 1956. Approximately 8% of the patients admitted to the Clinical Center are Jewish.

Summary Of Service

Sabbath services on Fridays and special service for the various major and minor Holidays of the Jewish calendar, including some socials after the celebrations.

Visits to patients.

Counseling of patients and families.

Religious education when requested and/or needed.

On call for emergency service twenty-four hours a day.

HS-3836
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Attachment A

FOR PERIOD:

March through November, 1961

REPORT OF CHAPLAINS ACTIVITIES

SUMMARY BY INSTITUTE*

		A	B	C	D	E	F	G	H
			PATIENT ACTIVITY			PASTORAL CONTACTS			
		TOTAL NO. PATIENTS	PATIENTS SEEN	NOT SEEN	%SEEN (B ÷ A)	PASTORAL (Pt., Fam., Staff, etc.)	SACRAMENTS	CONTACTS PER PATIENTS SEEN (E + F ÷ B)	CONTACTS PER TOTAL POP. (E + F ÷ A)
NCI	PROT.	1,281	715	566	44%	7,365	84	10.4	5.8
	CATH.	378	378		100%	1,228	2,234	9.1	9.1
	JEW.	82	78	4	95%	133		1.7	1.6
	TOTAL	1,741	1,171	570	67%	8,726	2,318	9.4	6.3
NIAID	PROT.	648	79	569	12%	172	6	2.2	0.3
	CATH.	140	129	11	92%	180	693	6.6	6.2
	JEW.	28	18	10	64%	21		1.2	0.8
	TOTAL	816	226	590	28%	373	699	4.7	1.2
NIAMD	PROT.	678	90	588	13%	141	1	1.5	0.2
	CATH.	161	161		100%	350	928	7.9	7.9
	JEW.	57	57		100%	77		1.4	1.4
	TOTAL	896	308	588	35%	568	929	4.8	1.7
NHI	PROT.	1,122	448	674	40%	3,751	14	8.2	3.4
	CATH.	259	259		100%	641	1,060	6.5	6.5
	JEW.	84	70	14	83%	73		1.0	0.8
	TOTAL	1,465	777	688	52%	4,465	1,074	6.2	3.8
NINDB	PROT.	836	224	612	27%	854	3	3.8	1.0
	CATH.	219	219		100%	569	1,020	7.2	7.2
	JEW.	106	100	6	94%	118		1.1	1.0
	TOTAL	1,161	543	618	47%	1,541	1,023	4.7	2.1
NIMH	PROT.	429	54	375	12%	162		3.0	0.4
	CATH.	109	109		100%	200	26	2.0	2.0
	JEW.	53	26	27	49%	26		1.0	0.5
	TOTAL	591	189	402	32%	388	26	2.2	0.7
TOTAL	PROT.	4,994	1,610	3,384	32%	12,445	108	7.8	2.8
	CATH.	1,266	1,255	11	99%	3,168	5,961	7.3	7.2
	JEW.	415	348	67	84%	448		1.3	1.0
	TOTAL	6,675	3,213	3,462	48%	16,061	6,069	7.2	3.3

*INCLUDES PASTORAL MINISTRY AND SACRAMENTS ADMINISTERED AT BEDSIDE, NOT SERVICES NOR SACRAMENTS ADMINISTERED IN CHAPEL.

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER
ADMINISTRATIVE BRANCH

EMPLOYEE HEALTH SERVICE BRANCH

CC-12
Serial Number

Major Goals

The Employee Health Service, utilizing concepts of modern occupational medicine, is first and foremost a service program directed toward preventing sickness absenteeism and promoting optimum health among NIH staff members. Providing services which will enhance the efficiency and productivity of individual employees will contribute significantly, although in an intangible way, to the fulfillment of NIH research goals. For the Employee Health Service to be effective, the emphasis must be on preventive medicine, rather than on therapeutic medicine. Although we recognize that it is extremely important to provide prompt and effective care for injuries and illnesses occurring on the reservation, we believe that more significant contributions will result from preventive programs such as periodic physical examinations, early case-finding surveys, and health counselling.

Major Progress

Preventive programs relating to health have been stressed during the year. The glaucoma detection program has been completed with 84 cases of incipient glaucoma discovered among 2217 employees examined. Individuals with consistantly elevated intraocular tension were referred to private ophthalmologists for treatment and follow-up. To date 15 are receiving active treatment for glaucoma; 34 are still being followed by their physicians and 35 have been discharged.

Immunizations have continued at a high level, with particular emphasis on those required for international travel. During the year, the NIH Employee Health Service has been officially designated an official WHO Yellow Fever Vaccination Center, and it is now possible for NIH employees travelling abroad to receive all required immunizations in the Employee Health Service.

Staphylococcus surveillance among employees having patient-care responsibilities has continued throughout the year by means of the periodic nasal culture program. Recent evaluation of these findings indicates a satisfactory degree of participation, indicating that we are obtaining a suitable cross-section which would provide significant epidemiologic information when needed.

Final plans were completed during the year for renovation of the main

Health Unit of the Employee Health Service and it is expected that the work will be carried out within the next two months. With these changes and the opening of the auxiliary Health Unit in the new Office Building, we are hopeful that some of our space problems of previous years will be alleviated.

A comprehensive Employee Health Service Manual was compiled during the year and was approved by the Director of the Clinical Center. To improve our public relations, the staff of the Employee Health Service has been instructed to make every effort to carry out its responsibilities in a consistant, uniform manner, following the documented policies and procedures outlined in this Manual.

A significant step forward has been made in our long-standing effort to acquire meaningful sick leave statistics. Payroll and leave statistics are scheduled to be programmed on an electronic computer in January 1962 and we have been assured that we will be able to receive reports as a by-product from data accumulated for other administrative requirements. Having current data on employee sick leave usage, which we hope to translate into meaningful morbidity data, will enable us to have an overall impression of the state of health of the employee polulation and will assist us in directing our preventive medical efforts in the most beneficial manner.

Preliminary plans have been made to cooperate with the Clinical Pathology Department, CC, in providing comprehensive periodic physical examinations to approximately 1000 NIH employees who are likely to remain at NIH for a period of ten or more years. We are hopeful that this program can get under way as soon as possible.

Major Problems

Limited space in the main Health Unit remains a problem as during previous years. Planned renovations will hopefully enable us to use our space more efficiently and thereby minimize this problem. We believe however, that consideration must be given now to eventual expansion to the opposite end of the corridor in space now occupied by the Laboratory of Neurobiology, NIMH.

Minor gains have been made during the year in acceptance of the Employee Health Service as a service primarily concerned with preventive medicine in the occupational setting. The Employee Health Service will never realize its full potential until the entire NIH staff, including all levels of management, understand and accept the basic philoposy of preventive medicine under which the service should operate. We will continue to direct our efforts toward this goal.

Selected Statistics

	FY 1961*	1960	1959	1958
Total Visits	22,798	32,589	27,579	28,014
Visits for Occupational Injuries and Diseases	2,355	4,904	3,138	2,600
Immunizations	9,918	12,411	15,604	13,154
Pre-emp. Physical Examinations	2,094	1,937	1,704	1,828
Laboratory Examinations	16,392	16,864	12,332	12,868
Referrals to Personal Physicians	2,359	2,024	1,736	1,631

*Procedures to tabulate FY 1961 statistics were simplified at the beginning of the year with elimination of minor services tabulated in previous years. Meaningful comparison of FY 1961 statistics with previous years is therefore impossible. However, it is our impression, based upon other relative workload indices, that FY 1961 data would be comparable, or slightly in excess, of past years. The revised method of collecting data will be continued, and we can therefore expect to be able to make valid comparisons once again in future years.

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH
SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
THE CLINICAL CENTER
SOCIAL SERVICE DEPARTMENT

SERIAL NUMBER CC-21
CALENDAR YEAR 1961

The year 1961 was characterized by the achievement of stability and the promotion of growth in a period of transition.

Foremost among the interests of the Department was the achievement of a high quality of service to a culturally and geographically diverse patient group by combining optimum care with systematic study of the specialized social problems of these chronically ill patients and of the most effective and efficient methods for handling them.

A good share of this knowledge was transmitted to the public health field this year through publications such as "Stressful Experiences Among Hospitalized Patients," the pamphlet "For Parents of Children with Cardiac Conditions," and the publication on "Adaptive Behavior in Competent Adolescents."

In line with the concern for effective and efficient patient care was the extensive analysis of the utilization of the Patients' Welfare Fund. It is of special interest to note that the analysis clearly establishes the Fund's fundamental contribution to the patient's optimum participation in clinical research.

In July 1961, Dr. Daniel O'Keefe, Chief of the Social Service Department, retired from the Public Health Service. While his departure was a great loss to the Department, the appointment of members of the Department to the positions of Chief and Assistant Chief guaranteed continuity of purpose in a program he had initiated and to which he contributed much vision and foresight.

Vacancies occasioned by promotion, resignation and expansion of program required an intensive recruiting effort. Since late June, six new staff members have been appointed.

In a field presently noted for scarcity of personnel, the Department was fortunate to be able to recruit social workers in the two categories believed essential to a program devoted to excellency in patient care and to the mission to add to knowledge about these patients:

1) The recent graduate highly recommended by professors of casework and research.

2) The experienced social worker who has demonstrated capacity to make a unique contribution in caring for patients and in adding to knowledge.

The staff development program this year represented the culmination of earlier efforts through the completion of interviewing for the staff project and the presentation of a workshop on "Concept Formation." At the request

of the Research Section of the Metropolitan Chapter of the National Association of Social Workers, the workshop will be presented to the community at an all day institute on "The Research Practitioner: From Potential to Reality."

PATIENT CARE

Within the framework of each Institute's specialized research program, the Social Service Section was confronted with the necessity of helping substantial numbers of patients quite distinct in culture, class and social problems but equally challenging in terms of social need. Included among the groups were Indian children (both normal controls and patients), Federal prisoners (both normal controls and patients), and normal controls from college and religious groups. Another group of equal import are patients whose chronic illness severely impairs their social functioning. Included herein are the children and adults with hemophilia; the patients being treated for crypotococcal meningtitis; the seizure patients; the ophthalmology group; the cancer patients faced with functional impairment as a result of radical surgery and, in a less dramatic but equally debilitating sense, the arthritis and hypertensive patients. In yet another category of severe need are the patients and their families confronted with the imminent prospect of death. In the cancer group of adults and children, the problem is a source of concern of many months duration; and in cardiac surgery it presents the problem of fright prior to surgery and, potentially, the impact of sudden separation.

An important complement to these concerns is Mental Health's series of family studies including the study of marital interaction; the study of the congenital, environmental and emotional factors which influence the child's development; the factors contributing to the adolescent's capacity to cope with the demands of college; an exploratory study of the biological and psychological correlates in depression and the studies of the schizophrenic and his family.

Each Institute requires an adaptation of the whole range of knowledge and function of the social worker to the particular needs of its group of patients. While each Social Service Department unit provides the fundamentals of supportive and rehabilitative help to the patient and his family, each one has also made a relatively unique contribution toward enabling the patient's maximum participation in the medical research program during the past year.

The Social Service Department staff assigned to the National Institute of Arthritis and Metabolic Diseases was most actively involved in preparatory interdisciplinary and interagency planning; implementing and working with a group of 18 ten-year-old Indian girls admitted for a follow-up study of calcium intake.

A contributing factor to the decision to undertake this study, as well as others involving children, was the presence of a group work program designed to help the child meet the demands of life in a medical research setting.

Mr. Joel Vernick, the group worker, deals with the children, either in groups or singly in relation to life and events within the hospital, utilizing not only the medium of scheduled group activities but also the "life-space interview" to help the child participate in medical and/or research procedures and in relation to disciplinary problems. This also includes meetings with nursing and other personnel regarding management of the children.

This program, in conjunction with the casework program, was extremely active this summer due to the presence of the Indian girls plus other children on other services. Not only the group worker but the Program Supervisor and the caseworker, Mrs. Myrna Weissman, participated actively in the Childrens' Activities Program for the Indian girls.

In relation to the same project, Mrs. Jessie Dowling, Program Supervisor, accompanied the Senior Investigator to South Dakota and North Dakota where she participated in the selection of subjects. In interviews with the parents, she explained the role of social service in maintaining close contacts with the parents during the period of study, and the plans for furnishing the children with positive growth and educational experiences (children's program) within realistic limits.

In the National Institute of Allergy and Infectious Diseases, the social service program, via the Patients' Welfare Fund, is instrumental in providing the supply of cigarettes, gum and candy to the normal control prisoner group. These are benefits which accrue to them in conjunction with their participation in the research program.

Presently, NIAID is preparing for the admission of a few leprosy patients. Since the first two will probably be Mexican adolescents, a knowledge of cultural factors and specific attitudes toward the disease is required to handle individuals who are also confronted with the problems of adolescent development.

Concomitant with her casework services and, particularly, rehabilitative services to the patients, Mrs. Lucia Mason has developed a study of the social and emotional effects of isolation on the patients on NIAID.

Of the medical Institutes, the National Cancer Institute is the first to utilize a social worker as an integral member of the interdisciplinary research team.

After a substitute holding operation of some six months by Mr. Lawrence Burke, Miss Geraldine Conner was appointed to provide casework service, as had been done previously and, in addition, to participate in each phase of the research process from design through analysis and publication in the study of "Parents of Children with Neoplastic Disease."

During the last six months, Miss Conner has participated in the development of research instruments such as a questionnaire for interviews with parents and a scale for rating certain social behaviors.

In the current phase of the study, the worker does comprehensive social histories on the families in the study, routine weekly interviews with each subject regarding current functioning, and participates as an observer in the weekly parent group meetings.

It is the worker's observation at the present time that if the project were to continue for another year, the urgent demands of this group of children and their families around the problems occasioned by the nature of the illness and the demands of the research would really require the services of two workers. One to be engaged in helping each current group of twenty children and their families and one to be engaged exclusively in the study.

The social service unit assigned to the National Cancer Institute through the interest and encouragement of the Program Supervisor, Mrs. Kathryn Himmelsbach, has given impetus to the use of psychiatric consultation, via the multidiscipline conference, as a means of seeking additional understanding for both staff and patients of depression and other emotional attitudes connected with cancer.

The NCI Social Service staff unit has analyzed the data on its study of "The Relationship Between Knowledge of the Focus of the Hospital and Frequency and Kind of Discharge Problem." The next step will be the write-up of the project.

The pamphlet written by Miss Roberta Peay, "For Parents of Children with Cardiac Conditions," reflects the interest of the social workers assigned to the National Heart Institute in developing their specialized knowledge of this patient group so that it is available to social workers and others in the public health field.

In the course of casework service to the patient, both Miss Joan Lindall and Mr. Delbert Nye are collecting data relevant to a better understanding of the special problems of the child and his parents when he faces cardiac surgery, and of the problem of the hospitalized hypertensive patient. In the former case, staff is handicapped in dealing with the child's problem because of the lack of opportunity to know him. In the latter, the staff is interested in helping the patient maintain his equilibrium during a long stay.

Both the Clinical Director and a Senior Investigator have asked the social workers in the Heart Institute to assist in the adjustment of the collegiate normal control and to initiate studies of his adjustment, particularly of the collegiate normal control to the environment of the medical unit.

Because of the possibility for good and varied experiences in working with patients and staff and the opportunity to work under the experienced supervision of Miss Barbara Murphy, Program Supervisor, the majority of workers recently graduated are assigned to the National Heart Institute to begin the process of integrating their skills in casework and research.

The social workers assigned to the National Institute of Mental Health's series of Family Studies are active in recruiting patients for the projects through their varied community contacts.

In addition, each of the social workers assigned to NIMH in the past year (Paul Blank, Carmen Cabrera, Robert Mahon, John Roatch, Walter Sceery and Charlotte Wilkie) has been instrumental in adapting social work techniques used in dealing with families to operationalizing a piece of the research project to which they were assigned.

The ability of this group to bring most appropriate knowledge and skill into the formulations of their projects is due, of course, to their own capacity and experience. It is also important, however, to note the perceptive staff placement and implementation done by the Program Supervisor, Mr. Stanley Hirsch.

Of the social services staff assigned to the National Institute of Neurological Diseases and Blindness during the year, Mr. Robert Savard and Miss Evelyn Walker continued to work on their project related to changes in social functioning as identified by 40 seizure patients having had temporal lobe surgery. After a period of intensive preparatory work, they presented their material for statistical consultation during the summer. The analysis is now in process. While the study represents the independent thinking, planning and laboring of Mr. Savard and Miss Walker, it is planned for collaborative publication with Dr. Maitland Baldwin in his monograph and independent publication in a social work journal. Miss Walker is also assuming prime responsibility for collaborating with Dr. Baldwin in preparing a "composite picture" of seizure patients studied here, this to be used in the introductory chapter of the monograph.

Mrs. Shirley Owen continues her interest and work on the project concerned with social effects of eye disease. The part to be completed first is a study of changes in employment and their relationship to the nature of this illness and vision loss.

It is evident from this summary that the social workers assigned to each of the Institutes are actively involved in direct service to the patient. Concomitantly, they are using the knowledge gained from the opportunity to help substantial numbers of patients in one disease category; to continually improve their services; to pursue studies, and to prepare papers for dissemination to the field of public health.

The lively interest of the Directors and Senior Investigators is noteworthy. They have sought the participation of the social work staff in implementing their studies. In doing so, the social workers have utilized the whole range of social work services. The Clinical Directors and Senior Investigators have also suggested the initiation of studies related to patient adjustment to the clinical research effort.

Because the utilization of the range of social work services in implementing the clinical research effort is a relatively new development, we are beginning an administrative project under the direction of Miss Roberta Peay and Mr. Robert Savard to describe these activities.

We believe it will be helpful in the orientation of new staff, and in answering the needs of other research and university settings who frequently

request the opportunity to visit or write for information about the nature of social work participation in a clinical research setting.

PATIENT WELFARE

In April 1961, Dr. O'Keefe appointed a Committee* to study the Fund. The principal reasons for the study were:

1) The continuing increase in the amount of money received and disbursed.

2) In contrast to the years prior to 1960, expenditures in the second quarter of 1960 were consistently above income (see attached graph).

Subsequently, the Committee, now consisting of Mr. Robert Savard and Mr. Delbert Nye, was given the specific administrative charge to analyze the authorized requests since 1959 in order to determine, (1) the nature of the financial needs of the patients at the Clinical Center, and (2) to use this understanding as a basis for further systemization of criteria for approval and methods of disbursal.

Categories of Expenditure

The review of requests led to the following categorization of the nature of expenditures (see attached charts for definition of terms):

Allowance to Relatives
Basic Necessities
Patient Activities
Patient Miscellaneous
Patient Transportation

It was evident upon review that the Fund had been used consistently to meet real and often critical needs of patients and their families. In fact, had the Fund not been available, suffering and extended hospital stay would have resulted because in many instances our patient group and their families are not eligible to use local resources. The Fund served, too, to avert the perception that the Clinical Center's specialized patient group impose an undue burden on the welfare resources of the Metropolitan area.

Amount and Nature of Expenditure

The overall expenditure from the Patients' Welfare Fund has increased from $6,059 in 1959 to $13,629 in 1960 and will be over $13,000 in calendar year 1961 since $12,600 had been expended by the end of the third quarter of 1961.

*Mr. Robert Savard, Mr. Delbert Nye, Miss Ellen Walsh

Since 1958, there has been a consistent rise in patient welfare expenditures. This would normally be expected on the basis of the rise in the cost of living, retrenchment of the United Mine Workers' benefits and increase in the number of patients, especially child patients. However, on closer inspection by categories of need, it was found that Allowance to Relatives and Patient Miscellaneous expenditures had increased by 150% in 1960 as contrasted with 1959. The increase was primarily in National Cancer Institute, National Heart Institute and the National Institute of Allergy and Infectious Diseases. There was, however, no coincident increase in the numbers of patients served in these two years (see attached charts).

A more intensive study of the nature of the patients' problems, through record review and discussion with total staff, indicated that beneficial treatment outcome directly related to research findings accounted for the increase in expenditures for child patients and their families on NHI's Clinic of Surgery and Cardiology Branch and, on NCI's Hematology Branch for the study of childhood leukemia. For example, more successful surgical procedures involve a longer stay for children on the cardiac surgery unit, and new chemotherapies involve repeated admissions for continuing treatment on the childhood leukemia unit, thus necessitating longer periods of financial assistance to parents from other areas when they need to remain with the children.

In the instance of Patient Miscellaneous, the marked increase in expenditures coincides well with the introduction of prisoner normal controls to the National Institute of Allergy and Infectious Diseases, and later the Johnstown normal controls to the National Institute of Mental Health. The latter category involved a rather large expenditure because their checks from the contracting organization were usually late. Consequently, it was necessary for the normal controls to borrow money to send to their families. While it is true that they donated a like amount back to the Fund, there still needed to be sufficient funds to disburse upon request.

It is most important to note that the utilization of the Fund relates to and substantially implements a varied and increasingly successful clinical research program.

Sources of Income

The basic income for the Patients' Welfare Fund since its inception in 1954 has been the contribution of the Recreation and Welfare Association of NIH. Their contribution has averaged $6,070 a year or 60%. The remaining 40% per year has come from voluntary contributions from a wide variety of sources. Chief among these are the contributions of patients, their families and friends, and individual contributions of staff members of NIH. These contributions, however, are an unstable source of income varying considerably from year to year. It is, therefore, incumbent that sufficient reserves be kept to carry the Fund through periods when voluntary contributions are not adequate.

In 1959, reserves reached a peak of $7,690 and then decreased to $7,500 in 1960, and to $6,400 in the first three quarters of 1961. While the Fund is not presently in trouble, this trend cannot long continue without

serious consequences.

Conclusions and Summary

It is fortunate that the R & W contribution, which accounts for the major source of income, is based on a percentage of their income. This contribution has risen along with the expansion of NIH personnel, maintaining about 60% of the total patient welfare expenditure.

The analysis of the Fund which has been summarized for this report was presented to the Executive Board of R & W and was received with much interest and appreciation. The generous and consistent support R & W has given to the Fund merits notice and commendation. Their continuing support provides a basic fund which can be used flexibly to meet the various and frequently changing needs of a patient group selected because of specialized medical problems from an exceedingly wide georgraphic area.

It is of real concern that, despite the substantial support of R & W, the trend toward increased need does result in greater expenditure than income.

In spite of the fact that all expenditures have been found to relate to real need concomitant with an increasingly expansive and successful medical research program, it is apparent that if the increase in expenditure continues to be greater than income, we must seriously consider the following choices:

1) Seek greater sources of income from a variety of voluntary contributors, which is a difficult and time-consuming operation.

2) Decrease our expenditures, and thus relate less effectively to the needs of patients and their families, which in turn affects maximum participation in the medical research program.

3) Seek administrative and/or legislative means to meet the needs of patients for basic necessities, incidental travel expenses, and for benefits which accrue to certain patient groups (e.g., prisoner normal controls) as a result of their participation in studies.

During the next year, we will continue a systematic review of the utilization of the Fund in order to be aware of developing trends and thus be prepared to implement our findings appropriately.

STAFF DEVELOPMENT

The staff project, "A Study of the Patient's Attempt to Persist in His Significant Family Role During Long-Term Hospitalization," is just completing the phase of data collection.

It is anticipated that information obtained from the analysis of the data will help to provide a more definitive approach to the social worker's assessment and handling of the patient and family's capacity to adjust to long-term hospitalization.

The project has required the active participation of the total staff in interviews conducted over and above their regular casework assignments. The staff has done this most willingly and has obtained maximum cooperation from the patient respondents.

Particular note should be made of the work of the Group Leaders: Geraldine Conner, Jessie Dowling, Barbara Murphy, Shirley Owen, Robert Savard and Joel Vernick. These staff members took responsibility to instruct staff members assigned to their groups in the import and use of the questionnaire.

Of equal significance was the work of the Sampling Committee: Paul Blank, Stanley Hirsch, Joan Lindall, Delbert Nye, Robert Savard and Myrna Weissman. This group had the continuing responsibility to select patients who fit the criteria for the study and of assigning them to be interviewed by staff members.

Another aspect of the staff project is the pilot study on "Loneliness Expressed by Family Members." This study is being conducted by John Roatch and Lilian Scherp. They are preparing a paper using the data from families and social workers to conceptualize loneliness; and to suggest how the loneliness of family members is most effectively alleviated.

In line with the objective of the staff development program, the doing of each phase of the project has been accompanied by a workshop on the principles related to this phase of the research process. In May, a one-day workshop was held on "Research Interviewing" under the direction of Mrs. Elizabeth Herzog, Child Life STudies Branch, The Children's Bureau. A committee composed of Miss Evelyn Walker, Mr. Robert Mahon, Mr. Walter Sceery and Mrs. Juanita Turk programmed the workshop using our own interview experience to focus the discussion.

For the past six years Dr. William Gordon, Professor of Social Work Research, George Warren Brown School of Social Work, Washington University, has been the staff's research consultant. He has given invaluable assistance in supporting the staff's efforts; in encouraging a "research frame of mind" and in implementing studies.

However, because of his commitments at the university, it has become increasingly difficult for him to arrange a series of regular consultation sessions.

It was agreed, therefore, that the Department would continue to use him periodically as a consultant to program. Another consultant will be recruited to carry on regular consultation on individual projects, and to lead a workshop on research methods in the course of regular visits.

As a culmination of our work with Dr. Gordon, a one-day workshop was held in November on "Concept Formation." At the workshop, three practitioners presented projects they had developed as part of their work assignment. Lucia Mason presented the development of her project on "Isolation," and John Roatch and Lilian Scherp presented the development of their project on "Loneliness." Emphasis was placed on the opportunity the worker's staff

assignment provides for obtaining an idea for study, as well as some of the challenges present in developing an idea for study.

The challenges inherent in the research process were further conceptualized by Geraldine Conner's paper on "Creativity" and Robert Savard's paper on "Uncertainty."

As was noted in the introduction, at the request of the Research Section, the Metropolitan Chapter of the National Association of Social Workers, the workshop will be repeated for the community.

In reviewing their respective workshops, both Miss Herzog and Dr. Gordon commented on the group's effectiveness. Miss Herzog observed "I have seldom met with so satisfying a group. Each member seemed interested in looking with fresh and honest eyes, thinking about what was perceived, and applying it toward better performance. This attitude is, of course, basic to sound research thinking and-(as I think I mentioned)-it also appears to be basic to first-rate casework practice."

We are now in the process of planning with our new consultant, Dr. Roger Miller. Dr. Miller can be particularly effective in a clinical research program because of his experience as a clinical social worker in a university and in a military hospital.

At the present time, he is professor of Social Work Research at Smith College School for Social Work, and is editor of the Smith College Studies in Social Work.

He was formerly assistant professor of Social Work Research at the School of Applied Social Sciences, Western Reserve University, when Dr. Norman Polansky was the professor of Social Work Research at Western Reserve. He received his doctorate from Western Reserve University in 1957.

While gains in productiveness are evidenced by the staff's capacity to provide a high quality of patient care and transmit knowledge about their findings to the public health field, it is our conviction that the staff is ready to produce at a consistently higher level and that the presence of a full-time staff research consultant would implement their enthusiasm and effort more consistently and, therefore, more productively.

Casework Workshop

The Casework Workshop for 1961 is being conducted by Miss Barbara Murphy. It is designed to provide an opportunity for staff members to further refine their diagnostic and treatment skills in dealing with casework problems in a medical research center. The emphasis is upon an early and accurate evaluation of the patient and family's ability to handle the hospitalization experience; and the appropriate choice of social work treatment.

The cases chosen for discussion range from medical problems with a major emotional component to problems of young parents facing the imminent death of a child, to overwhelming anxiety in contemplating surgery.

Review of Performance Expectations

One of the fundamental concerns of the Department is that the evaluation system for employees, whether in the Civil Service or in the Commissioned Corps, be an equitable one.

Mrs. Jessie P. Dowling has undertaken the task of specifying and detailing the appropriate behaviors expected in relation to performances required in the various levels of job description. The objective is to systematize the basis for evaluation, thus minimizing the value judgments of individual supervisors. While we realize this is an ambitious undertaking, it is encouraging to note that Mrs. Dowling has made an excellent start and one which meets with the general approval of the supervisory group, and an experienced staff member, called upon for an initial review of the project. The next step will be presentation to the staff for discussion.

RECRUITMENT

Upon Dr. O'Keefe's retirement in July 1961, Miss Ellen J. Walsh was appointed Chief of the Department; Mr. Robert Savard was appointed Assistant Chief, and Mrs. Shirley Owen was appointed Program Supervisor, National Institute of Neurological Diseases and Blindness.

Mrs. Dorothy Kuhl, a Catholic University graduate, filled the vacancy in the Clinical Endocrinology Unit in the National Heart Institute; Mr. Anthony Polcari, a transfer from the Indian Service, the Anchorage Hospital, filled the vacancy on the Medical Neurology Unit, National Institute of Neurological Diseases and Blindness, and Miss B. Belvin Rollins, formerly of the Medical College of Virginia, filled the vacancy in the National Cancer Institute, Endocrinology Unit. The two new positions in the National Institute of Mental Health were filled by Miss Carol Hoover, formerly of Saint Elizabeths Hospital Social Service Department, who is assigned to the Family Relations in Schizophrenia Project and Mrs. Dorothy Oberdorfer, formerly of Chestnut Lodge, to the study of Psychosocial and Psychobiological Correlates of Symptom Fluctuation in a Varied Group of Mental Patients. The new position in the National Heart Institute was filled by Mr. Harold Richman, a recent graduate of the University of Chicago.

While we have been quite successful in our recruiting efforts, we do meet with the problem of providing an adequate salary for the experienced caseworker.

Grades presently established by the Civil Service Commission for the Clinical Social Worker positions make it increasingly difficult to recruit social workers of sufficient casework-research background and experience to contribute fully to the clinical research effort.

During the past eight years the field of social work has stressed the concept that the experienced caseworker should be afforded a status commensurate with certain supervisory positions. However, the present classification and qualification system was established prior to this development; therefore, there was no provision made for adequate grades and salaries for the experienced caseworkers.

While we have had considerable assistance from Administration and Personnel in establishing several GS-11 positions for assignments requiring both advanced casework and research capacity, the ever increasing need for such positions is evidenced by the request of the Clinical Directors and Senior Investigators.

We are not in a truly competitive position with a number of good voluntary social agencies offering such qualified personnel the equivalent of a GS-11 grade.

PROGRESS

1. There has been a marked increase in reports of the Department's findings to the field of public health. There has also been a noteworthy interest on the part of various Clinical Directors and Senior Investigators in obtaining social work implementation of Institute studies, and in initiating collaboration with social service in other studies of patient adjustment.

2. The level of staff knowledge concerning research and the melding of of practice and research has advanced to the point where the staff's most recent research workshops, a product of total staff investment, is being presented to the metropolitan social work community.

3. We have been fortunate in securing three promising recent graduate workers and three well-qualified and experienced social workers.

4. We have further systematized criteria for approval and methods of disbursal from the Patients' Welfare Fund.

5. The allotment of a specific travel fund has permitted the Department to provide the opportunity for a maximum number of staff to attend professional meetings. The awareness at the onset of the budget within which we could work and close surveillance of actual expenses incurred has made this possible. In addition to the greater educational opportunities offered staff, increased attendance provides an opportunity to carry on a more consistent and effective recruitment program.

MAJOR PROBLEMS ENCOUNTERED

1. The rising expenditure from the Patients' Welfare Fund presented a critical problem which served to initiate an extensive analysis of the utilization of the Fund. From the study, additional understanding has been gained and pertinent recommendations are being developed.

2. The need to explore with our own Personnel Division and, ultimately, the Civil Service Commission, ways and means to provide a grade suitable for the experienced social worker knowledgeable in casework and research.

3. The need for better planning for the Federal prisoner patients has been evident this past year. They have frequently come inadequately prepared in terms of such basic needs as clothing, provisions for basic necessities,

and notification of family about proposed treatments, such as surgery. In addition, the prisoners are not adequately prepared for what they should expect of the Clinical Center in terms of the nature of its research and treatment mission, and rights and responsibilities of patients admitted here.

4. Adequate space for staff continues to be one of our most difficult and constantly growing problems. The majority of staff do not have the privacy needed for effective interviewing. Increasing need for more professional and secretarial staff further compounds the problem of currently inadequate space.

FUTURE PLANS

1. We need to establish a position for a full-time staff research consultant in order to provide consistent on-going help to staff in its various research activities.

2. We are planning a review of the statistical system to determine how improvements can be made so that it will accurately reflect the Department's involvement in different kinds of patient care and research.

3. We will continue to review in detail utilization of the Patients' Welfare Fund.

4. A study of job performance expectations has been initiated. The purpose of the study is to make our evaluation and promotion system as equitable as possible within the framework of the Civil Service and the Commissioned Corps system.

5. There is a vacant casework position in the National Cancer Institute and another in the National Institute of Arthritis and Metabolic Diseases which must be filled to bring both Institute sections up to the Department's staffing pattern of one social worker per nursing unit.

6. It is important to study the needs of the outpatient group, since it is the conviction of the social work staff that we are not providing sufficient help to patients during the initial periods of workup while on an outpatient status, nor during the followup visits subsequent to hospitalization.

Serial No. CC-21
Social Service Department
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: A Study of the Patient's Attempt to Persist in His Significant Family Role During Long-Term Hospitalization.

Principal Investigator: Miss Ellen J.Walsh, Project Director

Other Investigators: (Primary Investigators: Mrs. Jessie Dowling, Miss Barbara Murphy, Miss Geraldine Conner, Mr. Robert Savard, Mrs. Shirley Owen, Mr. Joel Vernick and Mr. Paul Blank) This is a Social Service Department project. In addition to the investigators named above, every member of the staff on duty from January-June 1961, participated in interviewing for the project.

Man Years (calendar year 1961):
Professional: 600 hours

Project Description:
Objectives: To test the hypothesis derived from clinical experience and an exploratory study, that the adult patient who is hospitalized thirty days or over and is a member of a nuclear family tends to attempt to maintain in the hospital whatever role and/or roles in the family he perceives to be his significant contribution to the welfare of the family unit.

Significance: If our study indicates that this phenomenon does exists, it can provide at the point of admission and/or referral, a "new and, possibly, more accurate pair of glasses," with which to assess and predict more quickly and validly the import of the hospitalization experience for the patient as a member of the family unit.

If we are clear early in the patient's stay about what he considers his crucial function in the family, we can work with him toward carrying out the task in the most comfortable way in terms of his physical condition and the medical research problem, or we may work with the patient toward modifying his task in order to fit in with his responsibilities as a patient. This approach reinforces his worth as a contributing member of the family and provides for his optimum participation in the medical and/or research plan.

Method: A structured questionnaire was chosen as the research instrument. The questions were constructed primarily to determine the extent to which a patient persists in performing in the hospital what

he perceives to be the three most important tasks (as indicators of role) he performs for his family when he is at home. The tasks elicited were those performed for the welfare, benefit or maintenance of the family as an on-going unit. The measure of persistence was determined by the use of an accompanying ordinal scale of task performance scored by the interviewer from information given by the patient respondent.

Beginning March 1, 1961, 100 adult patients (from all Institutes except Mental Health) who had been in the Clinical Center for one month were interviewed. An additional 25 patients were interviewed by two interviewers as a reliability check.

Major Findings: The data is just now ready to be tabulated and analyzed.

Serial No. CC-21
Social Service Department
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Staff Project on Loneliness of Family Members.

Principal Investigators: John Roatch, Lilian Scherp

Other Investigators: Consultants, Ellen J. Walsh, Dr. William Gordon

Cooperating Units: None

Man Years (calendar year 1961):
Total: 291 hours
Professional: 291 hours
Other: None

Project Description:
Objectives: The objectives were to conceptualize loneliness; study the effects of loneliness on the patient and his spouse caused by prolonged separation due to hospitalization; and eventual analysis of the implications for alleviating the loneliness of hospitalized patients and their spouses through casework treatment.

Method: Research data were obtained from structured interviews with patients' spouses and professional social work staff.

Major Findings: A major focus of these interviews was to obtain data enabling us to define and conceptualize loneliness as: "Loneliness is a psychological state of mind characterized by subjective feeling of inner emptiness and longing for a desired person or familiar surroundings." Other important findings are that the loneliness of family members is most effectively alleviated by consciously increasing activity; frequent communications with the patient; discussing feelings of loneliness with others; and knowledge that the patient is receiving good medical care.

Serial No. CC-21
Social Service Department
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: The Social Functioning of Patients After Temporal Lobe Excision for Epilepsy.

Principal Investigators: Robert Savard, Evelyn Walker

Cooperating Units: Surgical Neurology Branch, NINDB

Man Years (calendar year 1961):
1/5 man years

Project Description:
Method: Former patients who had undergone a partial or complete excision of a temporal lobe as treatment for psychomotor seizures were interviewed between two and five years after surgery to determine what, if any, change in their social functioning since surgery was identified by them. A two part interview was used; one part unstructured and one part structured. In half of the cases relatives were available and were also interviewed by the same method as a validity check.

Patient Material: Thirty nine patients who had returned for follow-up examination were used.

Major Findings: Analysis of the data has almost been completed using various statistical techniques. Preliminary examination of results suggests that social functioning in general improves as seizure frequency decreases with the greatest over-all improvement demonstrated by those who were cured. Individual areas of functioning did not in themselves dramatically improve except for an area which we have merely called, "thinking," i.e. ability to comprehend written materials, learning and following patterns of behavior on the job, understanding the meaning of what is said to them, etc. This improvement was related primarily to the cured cases.

In view of the fact that some improvement was reported by patients who were medically judged not to have been benefited from surgery, it is apparent that variables in addition to alteration of seizure frequency were also at work. One possibility is the factor of hospital milieu which may have accounted for some of the change.

In general, either there was no change or positive change from which we conclude that this kind of surgery does not harm social functioning--

patients are no worse off even if treatment was a failure and are often better.

Serial No. CC-21
Social Service Department
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Relationship between Knowledge of the Focus of the Hospital and Frequency and Kind of Discharge Problems.

Principal Investigators: Kathryn K. Himmelsbach, Geraldine Conner, Rintha Carter, Lawrence D. Burke

Cooperating Units: None

Man Years (calendar year 1961):
Total: 1/24th
Professional: None
Other: None

Project Description:
Objectives: Interest in this study arose on the part of the Social Service Department staff of the National Cancer Institute, when in the course of its clinical work there appeared to be a direct relationship between discharge problems and the patient's lack of knowledge of the research nature of the hospital.

This study was devised to test the following hypotheses:

1. The patient who knows that the Clinical Center of the National Institutes of Health is a research hospital where the length of stay is contingent not only upon the patient's medical requirements, but also upon the requirements of the research project to which the patient is admitted, present fewer discharge problems (from a social service viewpoint) than does the patient group which does not know or is unclear about the research purpose of this hospital.

2. That the discharge problems that do occur are more complex in the group without knowledge of the research purpose of the hospital.

3. That discharge problems are more complex in the group without knowledge when discrepancies in interpretation (regarding the purpose of this hospital) have occurred between the referring physician and National Institutes of Health personnel.

Method: A two part schedule was designed, the first part to test the study group's state of knowledge about the focus of the hospital. This schedule was administered to the study group which consisted of all adult patients admitted to the National Cancer Institute for a period

of six months from the date of initiation to the study. The sample, selected consecutively, consisted of 108 adult patients. The schedule was administered individually to each participant of the study group.

Patient Material: Adult patients admitted to the various inpatient units of NCI were used.

Major Findings: The data has been collected, categorized and analyzed. Statistical tests of the hypotheses have been completed. The hypothesis that number and complexity of discharge problems are related to a lack of or distortion of knowledge of the research mission of the Clinical Center were rejected. A positive association was found between lack of home and financial resources and number and complexity of discharge problems.

Serial No. CC-21
Social Service Department
Mental Health Social Service Section
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Some Considerations About Distortions in the Recording of Caseworkers Interviews.

Principal Investigator: Charlotte H. Wilkie, Ph. D

Other Investigators: None

Cooperating Units: None

Man Years (calendar year 1961):
Total: 1/3rd

Project Description:
Method: To study the nature and extent of distortions that occur in the recording of casework interviews, a series of nine interviews were recorded in process from memory and then compared with a tape recording of the interview.

Patient Material: Nine patients admitted to NIMH for psychiatric studies were used.

Major Findings: Three kinds of omissions were found:
1. Omissions resulting from a useful condensation which increased the meaningfulness of the clients' communications.
2. Some omissions were based on incomplete information or knowledge about some aspect of the clients' pathological behavior and thus were not clearly comprehensible to the worker.
3. Other omissions were found to be possibly due to the social worker's own psychological vulnerability to certain of the content communication by the client and the message was not perceived.

Significance: Many studies in the field of social work are based on data taken from case records. It is important that the basic reliability and validity of such records be investigated and sources of omissions and distortions be identified.

Proposed Course of Project: A report of this project has been accepted for presentation at the National Welfare Assembly to be held in May 1962.

Serial No. CC-21
Social Service Department
Heart Social Service Section
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: A Social Work Study of Significant Social and Emotional Data Needed for Early Assessment of the Parent-Child Relationship Prior to Cardiac Surgery.

Principal Investigator: Joan D. Lindall

Other Investigators: Barbara A. Murphy

Cooperating Units: None

Man Years (calendar year 1961):
Total: 74 hours
Professional: 72 hours

Project Description:
Objectives: The objective of this study is to improve casework services to children and their families during the child's hospitalization for cardiac evaluation and surgery, by clearly describing the clues to supportive and non-supportive parent-child relationships which can be observed in the initial hospitalization, in order to facilitate more effective casework intervention.

Current medical thinking recognizes the importance of emotional support to a child, during hospitalization and surgery, as a means of avoiding or alleviating severe fright which can interfere with medical treatment, or negatively affect the child's future psychosocial growth and development. The child-parent relationship is commonly accepted as one of a child's major sources of emotional support during a stressful period, and a large area of social work practice with these patients in the Clinical Center involves encouraging the parents to be here during tests and surgery, evaluating the effectiveness of the parents' support, and intervening appropriately when problems arise.

Method: The method used in this preliminary phase of this study was casework interviews with both children and families during the first two days of a child's initial admission to the Clinical Center for cardiac-diagnostic evaluation. To obtain comparable data about this dynamic relationship, a concept of sensitivity was developed and used. This concept is in the process of refinement. Currently it is defined as a perception of the child's needs and appropriate response. An appropriate response during the stress of hospitalization is one which

is trustworthy and comforting to the child. In order for the investigator to assess the complex parent relationship, data on the following three areas as secured:

1. Parents' reality problems and their reactions to these problems:

   a. In relation to their plans for this admission.
   b. In relation to the history of this child.

2. Children's verbal and non-verbal behavior:

   a. In relation to the hospital.
   b. In relation to separation.

3. The interaction of parents and children.

Patient Material: During 1961, 33 patients in the age group 6-10, admitted to the cardiology section of National Heart Institute for the first time, were used.

Major Findings: There are no major findings at the present time.

Significance of Study: This study is an attempt to conceptualize a small part of social work practice. This is a necessary step before clinical methods can be tested and professional theories can be built.

Serial No. CC-21
Social Service Department
Heart Social Service Section
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: What Do Social Work Services Accomplish in Relation to Specific Medical and Surgical Research Projects?

Principal Investigator: Roberta Peay

Other Investigators: Robert Savard

Cooperating Units: Members of Social Service Staff

Man Years (calendar year 1961):
Total: 50 hours

Project Description:
Objectives: To clarify and specify a social worker's functioning in a particular research center.

Method: Currently planned method is that of interviewing each member of the Social Service staff, excluding Chief and Assistant Chief, in order to determine their social work activity in relation to a number of current individual patients or situations. This activity will be described, the immediate objective of the activity determined, and the medical and/or surgical research objective specified.

Major Findings: The study is in the very early stage. There are no major findings as yet. The present focus is on designing the method for collecting data.

Serial No. CC-21
Social Service Department
Heart Social Service Section
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Environmental Stress and Dependency Patterns in the Hypertensive Patient.

Principal Investigator: Delbert L. Nye

Other Investigators: None

Cooperating Units: Experimental Therapeutics Section, NHI

Man Years (calendar year 1961):
Total: 1/8th

Project Description:
Method: A casework interview is held with hypertensive patients. Upon completion of the interview, the patient is requested to respond to a standard set of questions relating to environmental stress and dependency patterns. These data are transposed to a master chart for purposes of determining if the presence of environmental stress and dependency patterns are associated with fluctuations in hypertension.

Patient Material: Patients being utilized in this study are those admitted to the Hypertensive Study Unit of the NHI Experimental Therapeutics Section. To date the environmental stress and dependency patterns of 32 patients have been charted.

Major Findings: None as yet. The study is in the exploratory stage.

Serial No. CC-21
Social Service Department
Neurology Social Service Section
Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Changes in Vocational Status Occurring Among Persons Experiencing Eye Disease.

Principal Investigator: Shirley Owen

Other Investigators: None

Cooperating Units: None

Man Years (calendar year 1961):
Total: 52 hours
Professional: 52 hours

Project Description:
Objectives: Basic objectives are to ascertain: 1) kinds of employment found among patients at different degrees of vision loss resulting from eye disease; 2) nature of vocational changes attributed by patients to eye disease; 3) relationahips between these changes and characteristics of eye diseases, patients' expressed attitudes toward disease.

Patient Material: Material is being taken from records obtained on adult patients known to the investigator in providing casework services to persons hospitalized on Ophthalmology Service, NINDB.

Major Findings: None available pending final analysis of data.

PROFESSIONAL ACTIVITIES

Miss Ellen J. Walsh

Educational Director, Medical Social Work Section
Regional Institute Program
National Association of Social Workers
October 1961 -

Member, National Education and Practice Committee
Medical Social Work Section
National Association of Social Workers
1959 - 1962

Instructor, Seminar on "Theory of Supervision"
Catholic University
October 1961 - January 1962

Lecturer, "The Meaning of Illness"
American National Red Cross Training Center
March and October 1961

Mr. Robert J. Savard

Member of the Board and Chairman, Professional Services Committee
Family Service Agency
Montgomery County, Maryland

Member, Family and Child Welfare Section
Montgomery County Health and Welfare Council

Member, Executive Committee
Medical Social Work Section
Washington Chapter
National Association of Social Workers

Member, Research Section
Washington Chapter
National Association of Social Workers

Mrs. Jessie P. Dowling

Completed Term as Chairman
Washington Chapter
National Association of Social Workers

Member, Delegate Assembly
National Association of Social Workers

Professional Activities continued--

Member, Membership Committee
Psychiatric Social Work Section
National Association of Social Workers

Member, Social Policy and Action Commission
National Association of Social Workers

Member, Executive Committee
Washington Chapter
National Association of Social Workers

Mrs. Kathryn K. Himmelsbach

Member, Inter-Agency Service Conference
Health and Welfare Council
National Capital Area

Member, Social Work Sub-Committee
Metropolitan Division
American Cancer Society

Mrs. Shirley Owen

Member, Workshop Committee
Medical Social Work Section
Washington Chapter
National Association of Social Workers

Mr. Joel Vernick

Workshop Leader, "Implications for Group Work of the National Mental Health Report"
Washington Chapter
National Association of Social Workers

Presented "Group Work Program for Children on NIAMD" to monthly meeting Washington Chapter
National Association of Social Workers

Mr. Paul Blank

Member, Review Committee on State Merit Board Examinations
Department of Health, Education, and Welfare

Mr. Lawrence Burke

Member, Public Relations Committee
Washington Chapter
National Association of Social Workers

[redacted]

[redacted]

[redacted]

Professional Activities continued--

Mrs. Charlotte Wilkie

Consultant, Employee Health Service and
Member, Committee to Study Treatment Needs of Alcoholics Among NIH Personnel

Member, Education Committee
Washington Chapter
National Association of Social Workers

Member, Recruitment Committee
Washington Chapter
National Association of Social Workers

Member, Family and Child Welfare Committee
Washington Chapter
National Association of Social Workers

Member, Board and Education Committee
Montgomery County Mental Health Association

Chairman, Speakers Bureau
Montgomery County Mental Health Association

Delegate, Health and Welfare Council
Montgomery County Mental Health Association

Member, Health Conference
Health and Welfare Council
National Capital Area

TABLE NO. I
Social Services for In-Patients
Fiscal Year 1961

h	NCI	NHI	NIAMD	NIDR	NIMH	NINDB	NIAID	Total
	1003	728	477	-	596	440	239	3483
ıst	822	659	272	-	394	466	151	2764
ember	819	766	299	-	355	376	94	2709
ber	776	610	227	-	455	552	159	2779
mber	924	675	254	-	544	344	206	2947
mber	918	665	204	-	508	370	129	2794
ary	625	695	189	-	492	511	134	2646
uary	606	856	214	-	596	356	162	2790
h	809	894	208	-	732	425	95	3163
l	631	990	198	-	590	322	170	2901
	763	821	329	-	647	264	168	2992
	377	929	440	-	713	368	182	3009
L	9073	9288	3311	-	6622	4794	1889	34977

TABLE NO. III
Group Activity Report
Fiscal Year 1961

	RESEARCH ACTIVITIES		PRACTICE-PROGRAM ACTIVITIES		SOCIAL SERVICE DEPARTMENTAL ACTIVITIES		COMMUNITY AND PROFESSIONAL ACTIVITIES		CORPS, AND OTHER RELATED ACTIVITIES		TOTAL HOURS
	HOURS	%	HOURS	%	HOURS	%	HOURS	%	HOURS	%	
NCI	699	9	703	16	516	20	76	8	20	15	2013
NHI	554	7	887	20	573	22	79	8	42	31	2134
NIMH	5383	65	1459	34	811	31	494	50	42	31	8139
NIAMD	209	3	622	14	243	9	192	19	28	21	1296
NIAID	144	2	127	3	59	2	10	1	-	-	339
NINDB	1254	15	537	12	383	15	141	14	2	2	2315
TOTAL	8243	100	4335	100	2585	100	992	100	134	100	16286

TABLE NO. IV

PATIENTS' WELFARE FUND EXPENDITURES

Fiscal Year 1961

	Patient Activities, Grey Ladies, O.T., etc.	Patient Transportation	Allowance to Relatives	Patients' Misc. Expenditures, Phone, Clothes, Meals, Special Devices, etc.	Basic Necessities	Total Withdrawn
July, 1960	16.66	13.60	668.37	177.50	243.49	1,119.62
August	9.29	40.95	295.00	91.67	565.83	1,002.74
September	34.83	51.35	514.75	265.37	409.78	1,280.28
October	25.22	74.25	378.00	77.63	281.82	836.92
November	65.43	70.00	425.00	499.79	344.40	1,404.62
December	26.00	139.00	285.00	296.70	552.37	1,299.07
January, 1961	9.18	77.67	180.00	112.69	662.81	1,042.35
February	22.68	91.20	625.00	182.05	560.73	1,481.66
March	73.83	91.20	830.00	681.79	370.63	2,047.45
April	34.75	28.00	737.00	512.54	245.50	1,557.77
May	45.52	56.00	660.00	434.24	374.59	1,570.35
June	110.40		406.00	354.60	274.64	1,145.65
TOTAL	$477.79	$733.72	$6,00.12	$3,687.07	$4,386.59	$15,708.55*

RECAPITULATION:

Balance brought forward 7/1/60	$ 6,367.69
Fiscal Year 1961 Deposits	14,393.84
	$22,761.53
Fiscal Year 1961 Withdrawals	15,788.55
Balance on hand 6/30/61	$ 6,972.98

* Of the total amount withdrawn, $851.13 was used to purchase supplies for the special patients on 11 East.

Serial No. CC-21
Social Service Department
Bethesda, Maryland

Description of Categories of Patients' Welfare Fund Expenditures

In all categories represented by the attached charts, expenditures of patient welfare funds are determined on the basis of individual needs for which no other sources of funds are available. The kind and amount of such need is established by the social worker together with the patient and/or family except in the case of prisoner normal controls.

Patient Transportation

Includes all expenditures related to patient travel, such as fare, meals and incidental expenses. In most cases this involves supplementation of inadequate funds for return home.

Allowance to Relatives

Includes all expenditures to assist relatives to visit or remain with patients. Most frequent allowances are to parents of child patients for room, board and transportation.

Patient Miscellaneous

Includes expenditures for a wide variety of patient needs not covered by other categories such as clothing, telephone installation and long distance calls, and numerous other items. These are usually one time expenditures except for prisoner normal control supplies.

Basic Necessities

This category refers to a regular weekly cash allowance enabling certain patients to purchase cigarettes, newspapers, soft drinks and other comfort items in order to maintain morale and self-respect.

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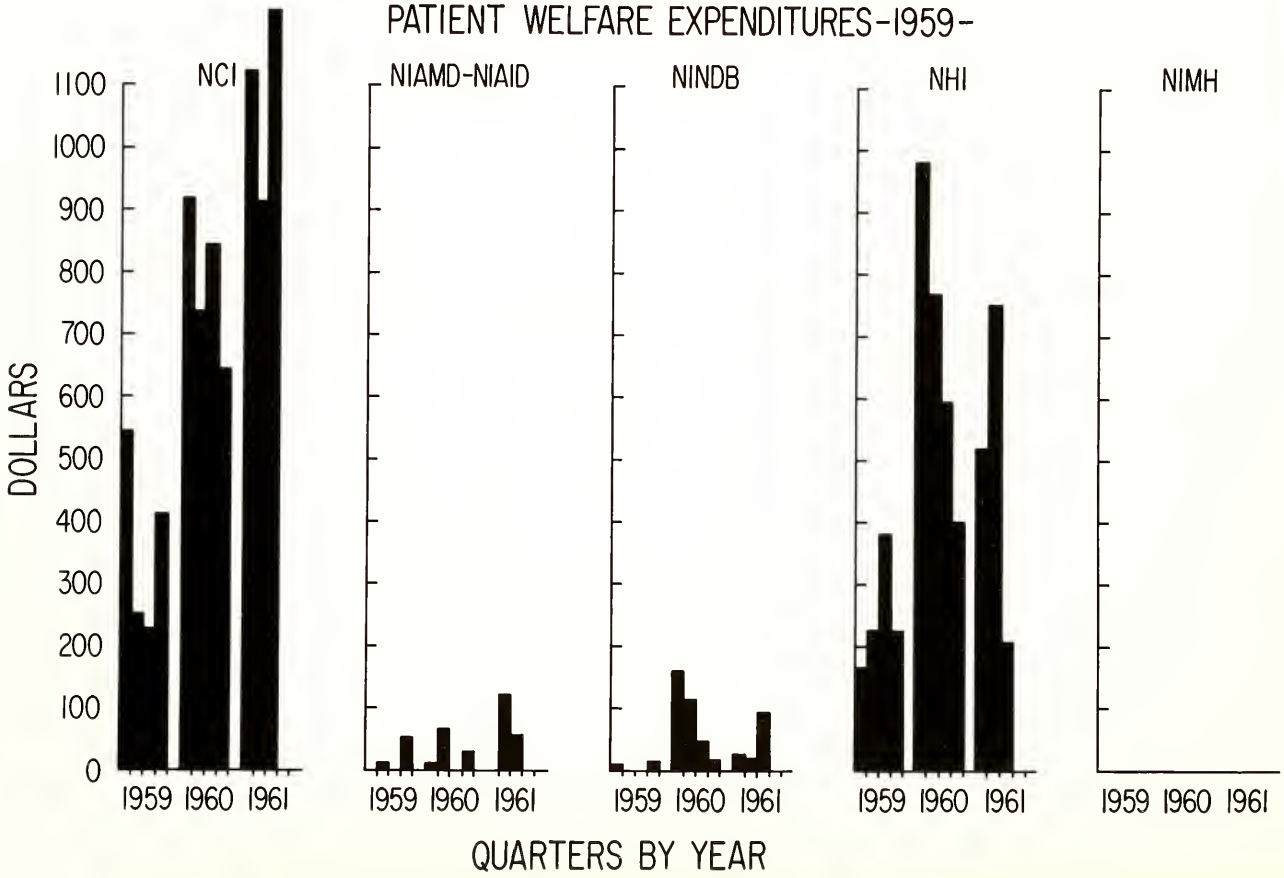
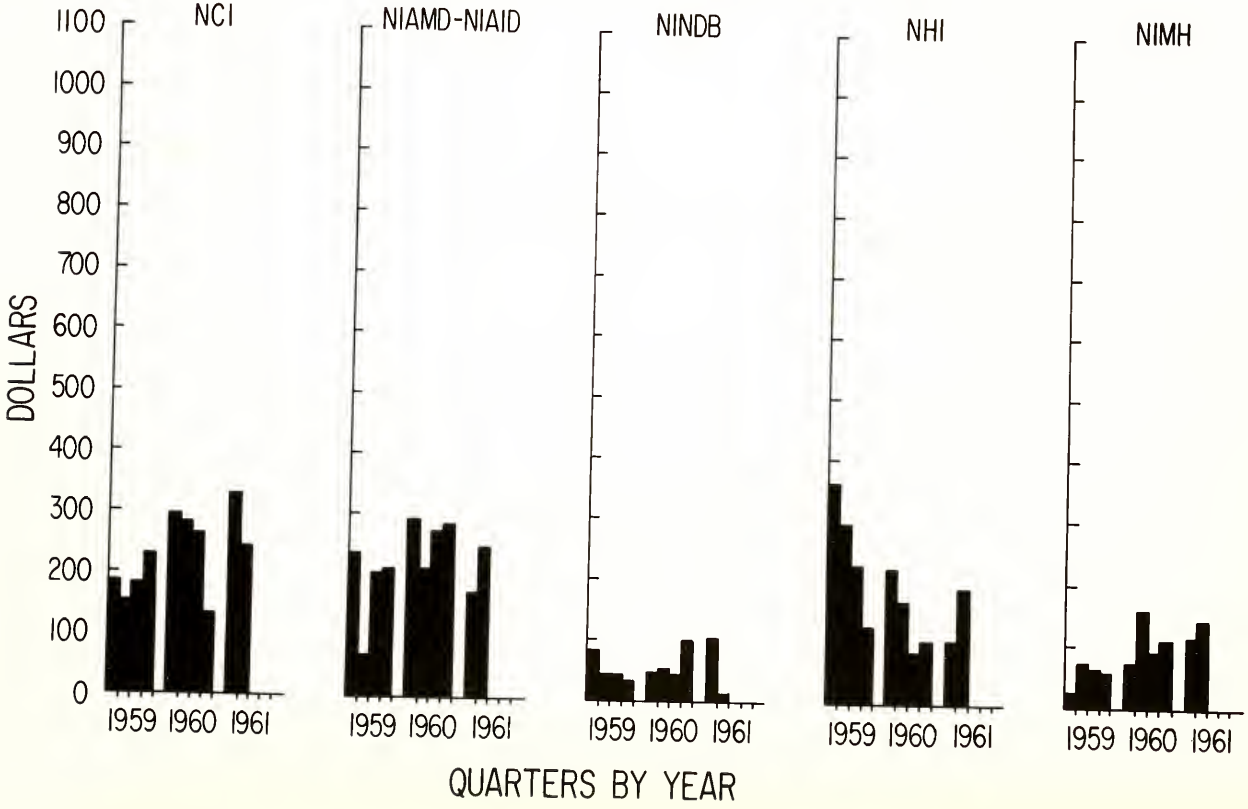
ALLOWANCE TO RELATIVES

PATIENT WELFARE EXPENDITURES-1959-



BASIC NECESSITIES

PATIENT WELFARE EXPENDITURES-1959-



Calendar Year 1961

PUBLIC HEALTH SERVICE NATIONAL INSTITUTES OF HEALTH

ANNUAL REPORT
CLINICAL CENTER

CC-34
Serial No.

ANESTHESIOLOGY DEPARTMENT

Activities of the Anesthesiology Department consisted of fulfilling its primary objectives of providing anesthesia and related supportive care for patients undergoing major operative surgery and diagnostic procedures where general anesthesia or close surveillance of vital signs were required, and for providing oxygen and other forms of inhalation therapy for all Clinical Center patients. Research activities included clinical projects, in which new anesthetic agents and methods were evaluated, collaborative work with investigators of NHI, NINDB, and NIDR, and the origination of a number of laboratory investigations which had a direct bearing on clinical problems encountered.

The full time staff consisted of the following personnel: (based on the yearly average)

Clinical Anesthesiologists	5½
Visiting Associate (Anesthesiologist)	1
*Research Anesthesiologists	½
Nurse Anesthetists	2½
Inhalation Therapists	3½
Secretaries	1¼
**Extracorporeal Apparatus Technicians	2/3
***Anesthesia Technicians	2

Outside consultants' services were regularly utilized three days per week on the days of the heaviest surgical schedules.

I. ANESTHESIOLOGICAL PROCEDURES. Anesthesia and supportive therapy were carried out in a total of 1182 instances for 803 surgical operations and 379 diagnostic procedures. In addition, diagnostic nerve blocks, consultations for respiratory and pain problems and emergency resuscitation measures performed outside of surgical areas, totaled 304.

*Assigned full time to Cardiology Branch, NHI
**Reassigned from Surgery Branch, NHI
***Detailed from Surgical Nursing Service

Anesthesiology Department

A large proportion of the relatively complex surgical operations and diagnostic procedures performed at the Clinical Center required the maintenance of anesthesia over unusually long periods of time, for example:

Anesthesia time exceeded 3 hours in 443 operations (37%)
Anesthesia time exceeded 5 hours in 174 operations (15%)
Anesthesia time exceeded 6 hours in 83 operations (7%)

Surgical operations were classified as follows according to the type of surgery and the special adjunctive techniques were employed as indicated:

1.	Thoracic (cardiac, pulmonary and great vessels)	
	a. extracorporeal circulation technique. . . .	111
	b. hypothermia technique	3
	c. usual technique	118
2.	Neurosurgical (brain and spinal cord)	
	a. hypothermia technique	5
	b. usual technique	105
3.	General surgical (abdominal, pelvic and inguinal)	
	a. hypothermia technique	1
	b. usual technique	128
4.	Perineal (genito-urinary, gynecologic)	43
5.	Head, neck, and face	63
6.	Eye, ear, nose, and throat	23
7.	Dental (majority with detailed physiological monitoring)	124
8.	Orthopedic	35
9.	Miscellaneous procedures	44
10.	Total	803

From the above tabulation, it can be seen that most of the surgery performed at the Clinical Center is concerned with such procedures as radical excision surgery for treatment of cancer of the pelvic organs and structures of the face and neck, cardiac surgery for correction of congenital and acquired defects with the aid of a pump oxygenator, so that the heart and lungs are bypassed during the period of definitive surgery, and surgery on the brain consisting of localization and removal of irritative foci as well as

the removal of intercranial tumors with the aid of hypothermia. Included were 36 stereotaxic procedures for treatment of syndromes characterized by abnormal movements and rigidity. Operations entailing the use of extracorporeal circulation were carried out in 111 instances, whereas hypothermia techniques were employed in 9 operations. The preponderance of lengthy complex surgical procedures required the attendance of two professional anesthetists, and the services of trained anesthesia technicians were necessary for the operation of monitoring equipment and thermal devices. A surprisingly large number (124) of short duration dental procedures, where elaborate physiological monitoring was carried out, also required two anesthetists and one technician for their conduct.

Diagnostic studies done under anesthesia numbered 379. Many of the patients were small children who were unable to cooperate under local anesthesia. Methods of controlled sedation over operiods of several hours were required for cardiac catheterization studies. Other tests done on adults required general anesthesia and complete muscular paralysis and respiratory control during selected periods. Since many of these patients were ill and the manipulations during the tests were capable of causing serious cardiac or respiratory reactions, special care was required in the anesthesiological management. Diagnostic tests done under general anesthesia are tabulated below:

Pneumoencephalograms	26
Cerebral angiography	89
Special eye or ENT examinations	11
Cardiac catheterization procedures	209
right heart catheterizations	66
trans-septal or percutaneous left heart catheterization	27
right heart catheterizations and angiography	61
angiocardiography or aortography	55
Cystoscopy	17
Miscellaneous	27

The following table indicates the institutes responsible for surgical cases with whom we worked. The first four institutes listed have surgical services. Patients sponsored by the last three

institutes usually have their surgery performed by surgeons of the institutes with surgical programs.

Sponsoring Institute	Procedures	Percent
* NHI	468	39
NCI	228	19
**NINDB	277	23
NIDR	120	11
NIAMD	38	3
NIAID	47	4
NIMH	4	0.3

II. INHALATION THERAPY ACTIVITIES. Inhalation therapy treatments were carried out by or under the direction of inhalation therapists. Consultation service was provided by an assigned anesthesiologist. The numbers and types of treatment during 1961 were as follows:

Oxygen therapy (tent, mask, catheter) . . .	8,121 hours
Humid atmosphere therapy	76,096 hours
Aerosol therapy	9,721 hours
Intermittent positive pressure breathing with aerosols	2,567 hours
Long term respiratory assistance	2,265 hours
Short term resuscitation	282 hours
Administration of oxygen combined with other gases (carbon dioxide, helium)	31 hours

A total of 185 new employees of the Nursing Department attended regularly scheduled demonstration sessions for the purpose of acquainting them with inhalation therapy practices and equipment. Special demonstrations of tank respirators, intermittent positive pressure breathing devices, and techniques of exhaled air resuscitation were conducted for 116 other employees.

*Includes 209 diagnostic procedures
**Includes 126 diagnostic procedures

III. RESEARCH ACTIVITIES. The following clinical studies were carried out during the year. Individual project reports are attached for new projects which were initiated for which members of our staff were the principal investigators.

1. The long-term study project concerned with the investigation of the physiological changes which occur during the use of general anesthesia for ambulatory patients undergoing multiple dental extractions was continued. While no new anesthetic agents were employed, modifications in technique were studied with the object of reducing the amount of stress to which the patient is subjected during surgery. Additional clinical observations were collected which will allow statistical assessment of our results. One publication. (See Sec. V) No new project report is being submitted this year.

2. Electronarcosis Study. Preliminary arrangements were made for a study of the use of various combinations of direct and alternating currents for the production of electronarcosis in animals. The Surgical Branch of NHI assumed responsibility for providing laboratory facilities and equipment with one of our staff serving as principal investigator. A survey was made of current progress in this field by visits to medical centers in Augusta, Georgia, and Jackson, Mississippi. Special electronic apparatus is being designed, and is in the process of construction, which will deliver direct and alternating currents of various frequencies and wave forms. It is planned to evaluate systematically the use of each current separately and in combination during animal studies. Since no formal experimental protocol has been decided upon and no studies have been initiated so far, a project report is not submitted at this time.

3. Studies on the effect of anesthetic agents and other drugs on myocardial contractility were carried out in three separate projects in which a member of our staff served as principal investigator. One publication and one presentation resulted with others to follow. Individual project reports are attached for the three studies.

4. One staff member was detailed full time to the Cardiology Branch, NHI, for the last six months of the year in order to give us an anesthesiologist experienced in laboratory investigation. Project reports emanating from this source will be submitted by NHI.

IV. MAJOR PROBLEMS ENCOUNTERED. No new problems were encountered during 1961. Difficulties with personnel recruitment, especially of paramedical personnel, and the inability to obtain accurate Civil Service designations for certain of our personnel, which would be commensurate with the duties performed, became an ever increasing problem throughout the year. The second major problem encountered was concerned with the allocation of adequate space to carry out our necessary activities. Several facets of these problems are outlined below.

A. Personnel recruitment

1. Anesthesiologists. A disproportionate amount of time and effort were expended to insure a continuing supply of qualified anesthesiologists to replace staff members who leave at the conclusion of their two years' obligatory military service time. The CORD Program has not been of as much help as we had expected. In order to be considered for deferment under this program, applications must be received by November of the year preceding the commencement of residency training. In most instances, our contacts with anesthesiology residents occur too late to obtain deferment for prospective staff members, even during their second year of training. The present salary scale for Medical Officers and the lack of independent research facilities seem to prevent us from attracting anesthesiologists on a more permanent basis.

   It is interesting to note that the financial support given to the universities both from the standpoint of grants for research projects and the latest form of direct grants to support full time research laboratory directors, has enabled the universities to far out-bid us in salaries and available facilities offered to anesthesiologists with investigative interests. As a result, we anticipate the loss of a staff member this coming year.

2. Nurse Anesthetists. Considerable difficulty has been encountered in finding suitable replacements for two nurse anesthetist vacancies. We are handicapped by salary scales and the particular working conditions prevailing at the Clinical Center.

3. Inhalation Therapists. The dearth of qualified applicants in this field makes it difficult for us to secure replacements. Employment possibilities under Civil Service are not sufficiently attractive for the recruitment of inhalation therapy trainees.

4. Extracorporeal Circulation Apparatus Operators. A real problem arose with the transfer of these personnel from the Surgery Branch, NHI, to our organization and the simultaneous resignation of the only incumbent in the position. By detailing a senior Inhalation Therapist to the position and recruitment of a second operator, the threat of vacancies in this vital position (which would have seriously curtailed the performance of open heart surgery) was temporarily bypassed. In the future, it will require a realistic approach to the matter of establishing these positions at a sufficiently high grade level to enable us to retain competent personnel.

5. Anesthesia Technicians. Anesthesia Technicians are required to set up, maintain, and operate monitoring devices used during anesthesia and surgery and to service special equipment used in the administration of anesthesia. Attempts to set up definite Civil Service grades for these positions have met with failure through inactivity on the part of our Personnel Office. During the past year two Nursing Assistants detailed to us on loan from the Surgical Nursing Service have carried out these duties. Attempts to get these personnel and an additional technician transferred to our organization have likewise been unsuccessful.

6. Secretarial personnel. Due to the shortage of Nurse Anesthetists, a second clerical employee was recruited to take over duties concerned with anesthesia records formerly carried out by one of our Nurse Anesthetists.

B. Space

Once again the lack of space constituted a major problem. The total lack of clinical laboratory space under our control in the Clinical Center forced us to set up specialized equipment for the determination of patients' blood volume, utilizing radioactive chromium tagged red cells, in a corner of our Anesthesia

Workroom. Gas chromatographic apparatus had to be installed in an anesthesia induction room as a temporary measure. The acquisition of clinical laboratory space in the New Surgical Wing will give us much needed space. As in the past years, we were very fortunate in being permitted to carry out laboratory investigation involving animal experimentation with the facilities provided by NHI and NINDB. Since organizational structure of NIH does not include such facilities for Clinical Center Departments, it is only in this manner that our staff can be provided with the facilities which they need. As pointed out in previous reports, the allocation of specific laboratory facilities might permit us to attract and retain anesthesiologists with research interests as regular members of our staff. The obvious benefits from the standpoint of making our organization more attractive to young physicians, who have completed their residency, can readily be perceived.

Anesthesiology Department

V. PUBLICATIONS AND PRESENTATIONS

The names of Anesthesiology Department Staff authors are underlined, the names of investigators from specific institutes are indicated, in the following summary:

A. Publications

1. Christenson, G. R., Hebert, C. L., and Driscoll, E. J. (NIDR)
Intravenous Barbiturate Anesthesia for Dental Outpatients
Published: Anesthesia & Analgesia Current Researches, Jan.-Feb. 1961

2. Morrow, D. H., Gaffney, T. E., and Holman, John E. (NHI)
A Chronotropic and Inotropic Effects of Halothane: A Comparison of Effects in Normal and Chronically Cardiac Denervated Dogs
Published: Anesthesiology, Nov.-Dec. 1961

3. Morrow, D. H., and Morrow, A. G. (NHI)
The Effects of Halothane on Myocardial Contractile Force and Vascular Resistance: Direct Observations Made in Patients during Cardiopulmonary Bypass
Published: Anesthesiology, Jul.-Aug. 1961

4. Bloodwell, R. D., Brown, R. C., Christenson, G. R., and Goldberg, L. I. (NHI)
The Effect of Fluothane on Myocardial Contractile Force in Man
Published: Anesthesia & Analgesia Current Researches, May-June 1961

5. Davis, T. B., Morrow, D. H., Hebert, C. L., and Cooper, Theodore (NHI)
An Increased Incidence of Paradoxical Hypertension Following Resection of Aortic Coarctation Under Halothane Anesthesia
Published: Anesthesiology, Jan.-Feb. 1961

6. Goldberg, A. H., Maling, Harriet M., and Gaffney, T. E. (NHI)
The Effect of Digoxin Pretreatment of Heart Contractile Force during Thiopental Infusion in Dogs
Published: Anesthesiology, Nov.-Dec. 1961
Published as summary: American Federation Proceedings, April, 1961.

Anesthesiology Department

B. Presentations

1. Goldberg, A. H., Maling, Harriet M., (NHI)
Gaffney, T. E., (NHI)
The Effect of Digoxin Pretreatment of Heart Contractile Force during Thiopental Infusion in Dogs
Presented: Annual Meetings of the Federation of American Societies for Experimental Biology, Atlantic City, April 1961.

2. Goldberg, A. H., Maling, Harriet M., (NHI)
Gaffney, T. E. (NHI)
Protection by Digitalization Against the Negative Inotropic Effect of Halothane in Dogs
Presented: Scientific Program, American Society of Anesthesiologists, Annual Meeting
Los Angeles, Cal., October 26, 1961
Scheduled for publication: Anesthesiology, Jan.-Feb. 1962

3. Hebert, C. L.
Profound Hypothermia for Cardiovascular Surgery. Anesthesiological Considerations.
Presented: Seminar, Div. of Thoracic Surgery, University of Maryland, Baltimore, Md., April 13, 1961

4. Hebert, C. L.
Electroencephalography during Anesthesia and Surgery.
Presented: Seminar, Anesthesiology Department, Georgetown University, Washington, D. C., June 1961

Serial No. CC-34
1. Anesthesiology Dept., CC
2. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Effect of Digoxin Pretreatment on Heart Contractile Force During Thiopental Infusion in Dogs

Principal Investigator: Alan H. Goldberg, M.D.

Other Investigators: Harriet M. Maling, Ph.D.
Thomas E. Gaffney, M.D.
Martha A. Williams

Cooperating Units: Laboratory of Chemical Pharmacology, NHI
Cardiology Branch, NHI

Man Years (calendar year 1961): 20 days professional, 8 other, 28 days total

Project Description:

Objectives:

To study, on an experimental basis, the value of prophylactic preoperative digitalization.

Methods Employed:

The effects on myocardial contractile force produced by an infusion of 1 mg/Kg of thiopental were observed with a strain gauge arch (Walton-Brodie) sutured to the myocardium of dogs. The amount of depression of heart contractile force produced by the thiopental infusion was compared in digitalized (digoxin 0.1 mg/Kg IV) and control dogs.

Major Findings:

In 8 control dogs, the mean percent changes in right ventricular contractile force produced by 15, 30, 45, and 60 mg Kg of the thiopental infusion were -9, -33, -50, and -61%.

In the 10 digitalized dogs, the mean percent changes produced by identical doses of the thiopental infusion were +3, -18, -27, and -31%. The differences

between the means are statistically significant at 45 and 60 mg/Kg (p 0.01) but not at 15 and 30 mg Kg.

Significance:

It is concluded that digitalization of dogs protects against the negative inotropic effects of 45 and 60 mg/Kg of a thiopental infusion. However, the effects of possible catecholamine release cannot be ruled out. These studies support the principle of the prophylactic use of cardiac glycosides.

Course of project: The project is finished.

Part B included

Serial No. CC-34

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B Honors, Awards, and Publications

Publications other than abstracts from this project:

The Effect of Digoxin Pretreatment on Heart Contractile Force During Thiopental Infusion in Dogs, by A. H. Goldberg, M.D., H. M. Maling, Ph.D., and T. E. Gaffney, M.D., ANESTHESIOLOGY Vol. 22, Nov.-Dec. 1961

Serial No. CC-34
1. Anesthesiology Dept., CC
2. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: The Value of Prophylactic Digitalization in Halothane Anesthesia

Principal Investigator: Alan H. Goldberg, M.D.

Other Investigators: Harriet M. Maling, Ph.D.
Thomas E. Gaffney, M.D.
Martha A. Williams

Cooperating Units: Laboratory of Chemical Pharmacology, NHI
Cardiology Branch, NHI

Man Years (calendar year 1961): 66 days professional, 28 days other, 94 days total

Project Description:

Objectives:

To assess the value of prophylactic preoperative digitalization on an experimental basis.

Methods Employed:

Inotropic (strain gauge arch), chronotropic, and pressor effects of 0.2%, 1%, and 2% halothane anesthesia were determined in open chest dogs before and one hour after the intravenous administration of digoxin (0.1 mg/Kg.)

Major Findings:

The average decreases in heart contractile force produced by 0.2%, 1%, and 2% halothane prior to digitalization were 33%, 73%, and 80%. After digitalization, these same concentrations of halothane decreased myocardial contractile force 25%, 53%, and 65%. The p values for these differences show that there was significantly less depression of myocardial contractile force produced by 1% and 2% halothane (but not by 0.2% halothane) after the administration of digoxin.

Similar results were found for mean arterial pressure.

Significance:

Pretreatment with digoxin significantly diminished the negative inotropic and hypotensive effects of 1% and 2% halothane anesthesia. These observations support the principle of the prophylactic use of cardiac glycosides.

Part B not included

Serial No. CC-34
1. Anesthesiology Dept., CC
2. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: The Chronotropic and Inotropic Effects of Anesthetic Agents as Altered by Pretreatment with Reserpine and Quanethedine in the Dog.

Principal Investigator: Julius Rein, M.D.

Other Investigators: Dean H. Morrow, M.D.
Gerald Austin, M.D.

Cooperating Units: Surgery Branch, NHI

Man Years (calendar year 1961): 12 days

Project Description:

Objectives:

The objective of these studies will be to compare the effect of anesthetic agents on the heart contractile force, heart rate, and systemic arterial pressure in animals in which total catecholamine depletion has been produced by Reserpine and Quanethedine pretreatment.

Method Employed:

Inotropic (strain gauge arch), chronotropic, and pressor effects of halothane, demerol and ether anesthesia in open chest normal dogs as a control group are determined and then redetermined when other groups have been pretreated with either Reserpine or Quanethedine.

Major Findings:

Pretreatment with Reserpine causes a greater negative inotropic, chronotropic, and pressor effect than in the normal control group with halothane. Other anesthetic agents have yet to be studied.

Significance:

If the other anesthetic agents yet to be studied produce less effects on the myocardial parameters studied than halothane, they may well prove to be the agents of choice in patients receiving Reserpine or Quanethedine prior to induction of anesthesia.

Part B not included

Calendar Year 1961

PUBLIC HEALTH SERVICE NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DIAGNOSTIC X-RAY DEPARTMENT

CC-35
Serial No.

Program Goals:

The primary objective of the Diagnostic X-ray Department is to provide a complete diagnostic radiological service for the various Institutes of the National Institutes of Health. Other objectives include the operation of an isotope clinic providing diagnostic brain scans, thyroid uptake studies and thyroid scans; provision of diagnostic research examinations on animals; the conduct of research to improve diagnostic methods; and the provision of advice and consultation on radiological problems to other divisions of the Public Health Service and other governmental agencies.

Developments and Trends:

As in recent years, the tendency has been to perform more and more complicated diagnostic radiological procedures. This trend was further exemplified during calendar year 1961 with the development of various techniques including lymphangiography, gynecography, and brachioarteriograms. The Diagnostic X-ray Department employed a full time staff radiologist to assist in the conduct of special radiographic procedures. Many of the minor surgical procedures involved with radiographic examinations have been taken over by the X-ray Department. The conduct of routine pneumoencephalography was further sophisticated by the introduction of fractional encephalography.

Another development within the Department was the initiation of an X-ray Technician Training School. This school will provide two important contributions to the Department, namely that of making available adequately trained personnel for employment and secondly the avoidance of prolonged periods of waiting for the hiring of a technician through Civil Service registers. With the new training program, it is anticipated that qualified technical personnel will be available for Civil Service registration prior to their actual completion of training, thus facilitating employment at termination of training period. Finally the addition of a training school provides an additional needed training facility as there is a constant shortage of technical personnel in the Washington, D.C., area.

The marked trend toward electronic instrumentation in the field of medicine was even more apparent during 1961. A 150 kvp radiographic unit with an image intensifying tube and a television Orthicon monitoring system was installed in the Diagnostic X-ray Department. This new unit with its electronic controls has many advantages over conventional equipment. It has provided a tool for the conduct of clinical research which has considerably widened the horizons for cooperative studies. All members of the research teams now can observe radiographic studies while in the process using this newer type of equipment.

A trend in recent years has been that of teamwork utilizing the skills of both radiologists and the other physicians in their particular fields in the conduct of the more complicated radiographic procedures. This approach was introduced in the Diagnostic X-ray Department during 1961. Numerous specialized radiographic examinations are now conducted as team projects.

In keeping with the publicity and importance placed upon radiation protection, further steps were undertaken within the Department to reduce radiation exposure to patients and personnel. This included the development of lead protecting devices, the further shielding of X-ray beams and the periodic checking of radiographic equipment to determine its continued safety for utilization.

The use of automatic film processing equipment has resulted in a change in pattern of patient handling within the Department. This development has led to the necessity of installation of an intercommunication system between the X-ray rooms, the X-ray reception area, and the film library. Utilizing this new communication system, it has been possible to expedite the handling of patients within the Department and to avoid recalls of patients from the floors on those occasions where a repeat film is necessary.

A new development within the Department in terms of an exigency was that of an acute shortage of film filing space. Intensive studies were made in an effort to obtain additional space elsewhere for film filing purposes. Finally a plan was drawn up to utilize the staff viewing area for film filing purposes and to use the corridors for staff viewing. This is a compromise which is not entirely desirable but a definite necessity.

As in previous years, new developments and trends in the field of radiology are closely followed by the Diagnostic X-ray Department. New products which offer real promise are investigated. Included in this category during 1961 was the use of powdered Hypaque as a new contrast medium for gastrointestinal examinations. Likewise new contrast agents in the field of cardiovascular radiography were evaluated. These included Renovist, 90% Hypaque, and Renografin. Renovist was adopted for angiocardiography as it is less toxic than Ditriokon, the produce previously used.

Plans and Future Work:

Plans for the immediate future include the installation of a radiographic unit which will be used exclusively for chest examinations. This unit will permit more rapid handling of patients for chest studies and at the same time avoid tieing up other radiographic rooms which are used for general X-ray procedures. The new chest room also will provide more adequate standardization of chest roentgenograms for research purposes.

Another step to be undertaken in the immediate future is that of equipping and operating the radiographic facility in the new surgical wing. Specifications have already been submitted and detailed plans have been worked out for this new radiographic installation.

Another planned facility for the immediate future is an image intensifying unit with a mirror system for radiographic studies. This image intensifying tube will be placed upon existing radiographic equipment thus considerably reducing the cost of X-ray generating equipment. With the use of the new image intensifier and mirror viewing, it will no longer be necessary for the radiologist to dark-adapt prior to the conduct of radiographic fluoroscopic procedures. This will appreciably expedite the conduct of fluoroscopic examinations in the department.

The X-ray Technician Training Program will be expanded to a total of eight student trainees during fiscal year 1962. The advantages of this training program have already been mentioned earlier in this report.

With the services of a full time radiologist now available for special radiographic procedures, the department plans to assume a more active role in the performance of radiographic studies involving minor surgical techniques. These include the conduct of femoral arteriograms, gynecograms, lymphangiograms, etc.

A planned replacement program for old radiographic equipment is proposed and more active steps will be undertaken in this direction during the succeeding fiscal year. This is necessitated by the increasing number of breakdowns in the older radiographic equipment. In order to conduct the best research studies in the world, it is essential that up-to-date, operative, and sophisticated radiographic equipment be available for this purpose. Future work within the department envisions the provision of such equipment.

Progress Achieved:

There was a slight increase in the number of X-ray procedures performed during the fiscal year 1961 as compared to 1960. There was a decided increase, however, in the number of such procedures performed during calendar year 1961, as compared to the preceding calendar year. This is a reflection of the rather abrupt increase in workload during the latter half of calendar year 1961. There was also a considerable increase in the number of thyroid scans performed, i.e., 119 in 1961 versus 25 in 1960.

New radiographic procedures introduced in 1961 included brachioarteriography and lymphangiography. Likewise, fractional pneumoencephalography replaced routine conventional pneumoencephalographic techniques. The adaptation of new faster film and lower kilovoltage methods resulted in improvement in film quality obtained with cerebroarteriography. A new contrast substance, Renovist, was adopted as the medium of choice for angiocardiography replacing the previously used Ditriokon.

Film filing equipment and new view boxes were ordered to be installed in 1962. Space changes are planned to provide an additional film filing area.

A new intercommunication system was installed within the Department permitting communication between the diagnostic radiographic rooms, the film library, and the reception area. This system has greatly facilitated the handling of patients within the department.

Approval was obtained for the X-ray Technician Training School. The training program was inspected and received high commendation for its completeness. In fact, the Department was encouraged to train a greater number of X-ray student technicians than originally planned or contemplated in the future.

A cooperative nursing program between the Surgical Nursing Service and the Diagnostic X-ray Department was established in 1961. This cooperative program has worked quite well and has resulted in the provision of more than one nurse at a time when required for the conduct of special radiographic procedures.

A full time staff radiologist was employed to conduct minor surgical procedures required in conjunction with special radiographic examinations. His addition to the staff likewise has made possible the conduct of teamwork between the Department and Institute physicians where complicated research studies require both a radiologist as well as other physicians.

Other achievements include the conduct of several departmental tours; presentation of a scientific meeting to the joint X-ray technicians societies of Washington, D.C. and Baltimore; the provision of consultation to various governmental agencies and other groups; the presentation of papers at national meetings and the showing of two exhibits at scientific meetings.

Major Problems Encountered:

The most severe problem encountered by the Department in calendar year 1961 was that of retention of trained and skilled personnel. Several key personnel resigned to accept more lucrative salaries outside the Service. Likewise a number of skilled employees were lost due to better opportunities for advancement elsewhere even though they gained but little in immediate salary. As in previous years, particular difficulty was experienced in the retention of dictating machine transcribers. This is, of course, understandable as the work is monotonous and not very stimulating.

The ever-expanding workload of the Department presented an acute space problem for film filing purposes. This required numerous consultations and a considerable portion of time was expended in an effort to procure additional space adjacent to the X-ray Department. This effort was unsuccessful, consequently, the staff viewing room within the Department was sacrificed for the purpose of providing film filing space.

The requirements that the X-ray Department use film currently on GSA contract forced the changeover from Eastman Kodak X-ray film to ANSCO film. This in turn required changing of radiographic techniques and posed a real problem in terms of comparative studies in conjunction with research projects. Evaluation of the response of metastatic lesions in the lungs, for example, to various cancericidal drugs requires standardized chest X-ray examinations for comparative purposes. This has been made more difficult due to change in film.

As in previous years, the problem of maintenance of radiographic equipment continued and became more severe. The bulk of the equipment is now in excess of eight years in age and has been used extensively. More frequent breakdowns have posed an increasingly difficult problem in maintenance of X-ray schedules.

The acquisition of more sophisticated radiographic equipment with electronic controls has, as expected, given rise to additional problems in maintenance. Since the installation of this equipment, two or more service calls have been required weekly to keep the equipment operative. It is anticipated that the majority of these maintenance problems, however, will be resolved before the one year service guarantee has expired.

Honors, Awards and Publications:

A total of six papers were authored or co-authored by members of the Department. In addition, numerous papers were presented locally which were not submitted for publication.

An exhibit entitled "Roentgen Findings in Soft Tissue Calcification" was presented at the American Roentgen Ray Society meeting in Miami, Florida. A second exhibit on "Optic Foramen" was presented at the Eastern Conference of X-ray Technicians in Lancaster, Pennsylvania. Both of these exhibits were well received.

The research technologist of the Department served as co-chairman of the Exhibit Committee at the Third International Convention of X-ray Technicians in Montreal, Canada. He also presented a paper at this meeting and was appointed a member of the nominating committee for this Society. Likewise, he has been appointed a member of the radiological technician team for inspection of X-ray technician training facilities in the Washington area.

The Department chief presented the annual radiographic lecture at D.C. General Hospital. He also presented a paper at the American Roentgen Ray Society meeting in Miami and at the North American Radiological Society meeting in Chicago. The Department chief was also appointed as a Consultant in Radiology at the Naval Medical Center.

Numerous papers were presented by staff members at radiological meetings in the Washington, D.C., area and at Walter Reed General Hospital and at the Naval Medical Center. The Senior Resident in Radiology was invited as the guest speaker at a symposium on fluids and electrolytes at the American Medical Association meeting in New York City. This radiologist was a pediatrician prior to his training in radiology and intends to practice pediatric radiology in the future.

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CLINICAL CENTER

DENTAL DEPARTMENT CC-36
Serial No.

The responsibility which the Dental Department of the Clinical Center has in supplying examination, diagnosis, consultation and dental treatment to the patients of all the Institutes in the Clinical Center of the National Institutes of Health, has been performed satisfactorily in calendar year 1961. in addition, the Department has rendered a more detailed and expanded service to both the in- and out-patients of the National Institute of Dental Research, which patients, by nature of their dental illness, are in need of such special consideration.

Whereas, the dental service rendered in many university and research hospitals is considerably different from the routine hospital dental service in certain areas, the operation of the Clinical Center Dental Department is unique in many respects. This condition arises principally for the reason that the seven Institutes have a particular population of medical and surgical entities, whose dental problems are very much at variance from that seen in the average or even specialty hospital.

Although interesting and typical examples could be cited from the files from each of the Institutes, for the sake of brevity, several of the specific problems in patient management NHI and NCI patients will be cited as representative of the overall Clinical Center picture.

National Heart Institute -- Patients with congenital defects who are to have heart surgery pose problems of dental management in both the pre- and post-surgical periods.

There are special considerations necessary in the performance of dental operations on all patients with hypertension, inasmuch as fear and anxiety are the usual accompaniments to the procedures. Experience and care is also necessary in handling hypertensive patients who are on anti-hypertensive investigational drugs.

All patients with rheumatic heart disease present particular problems. In patients with this disease, even such a simple procedure as an oral prophy-

laxis has been known on more than one occasion, in the absence of proper dental evaluation, to precipitate a fatal acute bacterial endocarditis in the absence of adequate antibiotic coverage.

National Cancer Institute -- Ingenious prosthetic devices, although very often complicated and time-consuming to produce, are necessary in the post-surgical management of intra- and extra-oral head and neck cancer. Intra-oral splints for patients who have had large areas of their oral and masticatory apparatus removed, make a dramatic difference in the recovery of these subjects because of emotional, hygienic and other vital factors which lead to an earlier physical and mental rehabilitation.

Artificial noses, ears, and eyes, of a very high quality, which often defy detection even to the critical observer, are produced for NCI subjects in an almost routine fashion.

Many of the N. I. H. scientists doing both clinical and basic research have found that the Dental Department personnel, both professional and technical, have a thorough knowledge of modern plastics, metallic castings, etc. Because of this knowledge of materials and their technical ability to fashion precision custom-made appliances, the Department personnel has been found not only willing but able to take the description of a scientist's mental image and fashion it into a workable instrument or appliance. Example: The precision, removable, clear plastic windows which were made in the Department for an NINDB visiting scientist who was working on cat brains. He needed an accurate transparent removable and replaceable cover through which the cat's brain could be observed over varying periods of time up to several months. The Department was happy to fill this request and was instrumental in the overall success of the project.

Although the primary function of the Dental Department is "Service" (Diagnosis, consultation and treatment), cooperative research with the National Institute of Dental Research as well as the other six Institutes has been encouraged and has been accomplished in many areas:

The project with the Leukemia section, NCI, instituted in 1955, has been continued and even though its primary objective is the treatment of the debilitating oral manifestations of this malignant disease, it has also resulted in several contributions to the scientific literature.

Other cooperative enterprises include: (1) A study of an unusual type of non-odontogenic, multiple jaw cysts, associated with multiple basal cell carcinoma. (Dermatology-NCI). (2) Secretory sialographic studies on rheumatoid arthritics and on other so-called collagen diseases are continuing with physicians of the NIAMD. (One publication has resulted). (3) A study in the basic physiology of ambulatory dental patients undergoing general anesthesia for dental

surgery is continuing. (NIDR-Anesthesiology Department, Clinical Center. Two detailed reports on over five hundred operations have been published.)

A very close working arrangement exists between the staffs of the Dental Department and the NIDR. Since the majority of the Institute's studies involve dental treatment and management as an integral part of the research, the Department has been found indispensable. Examples:

I. Periodontal Research. One of the basic considerations in proper periodontal treatment is the restoration to integrity of the masticatory apparatus. A large majority of the periodontal patients need operative and prosthetic work, ranging from a relatively few restorations to full-mouth rehabilitation, which in some cases calls for operations on every tooth in both arches.

II. Orthodontic Research. There are now three investigators working in this section and a large number of their patients need operative and surgical procedures. A clinical research project is developing in the surgical and orthodontic management of unerupted teeth which may result in a significant contribution to the clinical science.

III. Prosthodontia. In addition to research in materials and in the techniques used in the fabrication of splints and appliances for the NCI, the Department is carrying out a project designed to study the effects of postextraction bone absorption as it relates to pre-operative conditions such as degree of periodontal involvement, as well as operative procedures such as immediate vs. delayed alveolectomy, and post-operative conditions such as relining and periodic occlusal adjustments of the artificial dentures.

IV. Operative Dentistry. The dentists in the Department are performing operations on the teeth with cutting instruments revolving at various speeds ranging from 5,000 to 300,000 rpm and are collecting data for the scientists of NIDR. The results of these studies have been accepted by a large proportion of the dental profession as one of the most significant contributions made by NIDR in the area of clinical practice. There have been at least six studies published on the effect of instrumentation on the dental pulp. Future publications are being eagerly anticipated, not only by a large segment of the practicing profession, but also by those engaged in teaching and research in the Dental schools.

V. Oral Surgery and Medicine. The majority of the studies in this field are being conducted by NIDR scientists but, as in all the above-mentioned studies, the Dental Department is taking an increasingly active role.

Training. The Periodontal residency has been progressing very well. The trainees are receiving a good practical course in clinical periodontology and are carrying out research projects as well.

The Oral Pathology residency is totally dependent on the Dental Department to secure patients for its study of clinical pathology. The Department screens, catalogues, and accepts patients with specific conditions under study and with unusual and interesting oral diseases. Biopsies and other special materials needed in the training program are also obtained.

One of the Clinical Center dentists (Dr. H. Swerdlow), returned in July from a Prosthetic residency he served at the USPHS Hospital in Seattle, Washington. He has been assisting the Chief of the Prosthetic Department in this specialized field and will be able to take on many of the responsibilities of this Department in calendar year 1962, since the Chief has been transferred.

Another dental officer (Dr. R. Dubner) is at present in training at the University of Michigan and it is anticipated that he will receive a Ph. D. in Physiology.

PERSONNEL

A. Professional. There were 6 full-time dentists engaged in the previously described dental activities in calendar year 1961. Facilities and assistants were afforded to 19 NIDR dentists who operated in and used the facilities of the Department during the last year.

B. Administrative and Clerical. There were 4 full-time and 1 part-time employees engaged in this activity in 1961. Due to the large increase in NIDR professional employees using the dental clinic since July 1961, the records as well as the related activities have increased significantly, and this administrative area is at present in need of study, re-evaluation and probably reorganization.

In the last year we lost 3 clerical employees, at least two of whom left because of inability to obtain promotions or because some assurance of a future advancement possibility could not be granted. We are likely to lose additional personnel in this area if certain inequities in the Clinical Center Dental Department and NIDR employee practices are not amicably settled.

C. Semi-professional and Ancillary. 1. Dental Assistants. There were 7 dental assistants employed in 1961, an optimum of one dental assistant for each operating dentist, which is a necessity in this type of operation and such a numerical relationship will continue to be our objective. 2. Laboratory Technicians. There are 3 hard-working, diligent, imaginative craftsmen working in this section. Two of the technicians will have to obtain rate elevations if we are to discharge our moral obligation and from a practical standpoint to keep them in government employment. 3. Dental Hygienist. The practice of dental hygiene in the Clinical Center, in addition to supplying a necessary adjunct to complete dental treatment is also a tremendous morale

builder to both the ill patient and to the normal volunteer. 4. X-ray Technician. The efficiency of the X-ray Department has been considerably improve over the last few years, and with the addition this year of a new revolutionary machine, a panoramic exposure, full-mouth screening X-ray device, we can hope for further improvement as well as better diagnostic service.

The Dental Department is prepared to perform, and has rendered, all types of dental treatment found necessary for the patients examined. The following table documents statistics and is self-explanatory:

	1959	1960	1961
Admissions to Clinical Center	3,400	3,868	3,876
Examinations	1,605	1,682	1,540
Visits	9,152	10,308	10,827
Treatments	10,838	11,086	12,150

The only pertinent comments on the above-presented statistical material are: 1) The 500 additional visits, and 1,000 additional treatments performed in 1961 are a reflection of the additional NIDR employees who reported in July. There is every possibility that there will be a further increase in both visits and total treatments in fiscal 1962 now that these professional personnel have become accustomed to the routines.

2) The most significant factor revealed by the above data is that we are examining only 40% of the total admissions to the Clinical Center. We are hopeful that the number of examinations requested by the Clinical Center physicians will be increased to a much higher percentage in 1962.

The objective of the Dental Department, as originally conceived, was to furnish the highest quality dental diagnostic and treatment service to the patients of the Clinical Center. In addition, it was to provide intelligent consultation on dental problems as they relate, not only to the diseases being studied, but also importantly, to provide an evaluation as to what part Dentistry plays in the conduct of the individual research projects.

The Department has continued to perform these functions and, in addition to its major objectives, it has provided a most stimulating morale building and maintenance service not only to the ill but also to the normal volunteers.

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CLINICAL PATHOLOGY DEPARTMENT CC-37
Serial No.

MISSION

The laboratory support of patients in a Clinical Research Hospital differs from that in a general hospital in that major emphasis must be on a research level of accuracy and sophistication and much more frequent (repetitive) tests for continuing patient evaluation.

Our Mission includes:

Research quality laboratory support of patients
Evaluation of new procedures and instrumentation
Application of laboratory to normal health evaluation
Adaptation of research techniques to everyday patient studies
Leadership in research and development of automation and laboratory data processing
Multidisciplinary approach to clinical pathology research
Exemplary training of clinical pathologists

A New Frontier in medicine is emerging; the clinical laboratory is no longer the closet in which a few confirmatory blood counts and a bit of urine analysis are done; the Clinical Pathology laboratory is the focal point of the advance of modern medicine. Here large numbers of accurate scientific measurements of life processes and reactive changes are correlated and compared to the individual's own previously established base-line patterns to provide the physician and investigator with a range and magnitude of comprehensive information on which to base conclusions and guide management. Man's brain possesses the unique ability to select by association and almost unerringly deduce secondary information and conclusions with remarkable facility, but is overwhelmed at the impossible task of remembering, correlating and comparing myriad facts, even 40 or 50 simultaneously. His capacity to integrate many data quickly is limited but the numbers of related laboratory data which can be obtained on any one person are growing exponentially. Modern computer methods can be employed to store, retrieve, correlate, and classify such masses of figures for intelligent use, thus enabling the physician to enlarge his abilities to a degree never before imagined.

An example of the potential value of this approach is the control of intensive cancer chemotherapy or radiation therapy by comprehensive and continuous laboratory evaluation of the patient's response. Another example is the application of periodic comprehensive examinations to continuing evaluation of normal health. The clinical research potential of this source

of information is untapped.

Another important phase of our mission is that of providing opportunity for independent research within the Department. We have an exceptionally favorable situation for correlated physical, chemical and biological studies directed to understanding the complex reaction patterns of the total patient. Our vantage focus of continuous contact with patients and problems of every Institute provides an unique and daily source of investigative challenges and material.

Training of young physicians in Clinical Pathology and advanced refresher experience for both Service and civilian pathologists utilizes the special advantages of clinical pathology in a research environment. These functions fulfill our responsibilities of national leadership in promoting the highest level of medicine by better laboratory practice, teaching and research. We must expand our beginnings in this direction to meet our obligations.

To better correlate operations and workload, statistics are reported herewith for calendar year 1961 and all comparisons are made with calendar year 1960.

WORKLOAD

449,078 patient care test procedures were performed by a technical staff of 44 on 399 patients (average census) in calendar year 1961. The average workday load per technologist was 40.9 tests, an increase of 18% over the previous year. The total tests performed represents an overall increase of 13% compared to an increase of 15% the previous year. There was a sudden sustained increase in workload beginning in May. The workload for the latter half of the year was 9% greater than that of the first half, with a peak in September which was 33% above the average daily workload of the first four months. This unusually rapid increase in workload strained the capacity of the Department because of limited space and staff.

Year	Total Tests	Increase Over Previous Year
1961	449,078	13%
1960	398,734	15%
1959	346,300	19%

	Clinical Chemistry	Hematology	Microbiology
Tests	220,040	156,048	72,990
Percent of Total	50	34	16

PERSONNEL

The following promotions were earned and accomplished during 1961:

1 Chemist	From GS-7	to GS-9
7 Medical Technologists	GS-5	GS-7
2 Medical Technologists	GS-7	GS-9

2 Medical Technicians	From GS-6	to GS-7
1 Medical Technician	GS-5	GS-6

The spread of GS levels available to the technologists is inadequate. For example, inexperienced personnel are employed at the GS-5 level and can be advanced to GS-7 after one year of experience or laboratory training. Our best, nonsupervisory technologists with years of experience, are GS-7 and the few supervisory technologists are GS-9. This provides too restricted promotion opportunity, little incentive, and severely limits our ability to reward excellence and progressive development by education and experience.

Attrition

Of 56 Technologists and Technicians (including Chemists and Bacteriologists) 17 (30%) were separated during the year. This high figure was a matter of concern and each case was investigated. Seven (40%) of the 17 separations were related to pregnancy and family responsibilities. Five (30%) left to improve their financial status and/or opportunity for advancement. In addition, two members of the professional staff, at the GS-9 level, left to improve their financial status and opportunity for advancement. Five (30%) were requested to resign. These latter individuals had been recruited at times when replacement of staff loss became an emergency due to overwhelming workload. Under these exigencies the necessity of replacement overruled the requirements of careful selection and thorough investigation of technical ability. The Personnel Department was also severely short staffed and could not provide proper support in screening applicants. This experience emphasized the need for more careful evaluation by disinterested staff in our Department as well as by the Laboratory Chief seeking candidates. In the future, the applicant's former professional supervisor will be contacted by telephone before a committment is made to employ, in addition to obtaining the routine written recommendations which usually are non-committal or otherwise useless.

Recruitment

Recruitment of competent technical staff remains a perplexing problem with long periods each year of few or no adequately qualified candidates. The low salary scales, effective competition of non-governmental hospitals, inadequate and few training schools and restricted advancement opportunities mitigate against a continuous flow of applicants.

We have experienced continuing difficulty in maintaining a full clerical staff. Rarely during the year were all our positions filled and most of the year, due to these vacancies, we have been unable to maintain current all clerical work. Frequently important correspondence, such as bone marrow reports to physicians was unavoidably delayed several days. Not only are there few candidates, but work opportunities are not attractive. Levels are

from GS-3 to an occasional 5; promotions are very difficult to effect regardless of excellence, and the workload is heavy.

Professional Staff

Dr. Ernest Cotlove, formerly Senior Investigator, Laboratory of Kidney and Electrolyte Metabolism, National Heart Institute, was appointed Chief of Clinical Chemistry effective July 1, 1961. Dr. Cotlove spent six months at Hammersmith Hospital, Postgraduate School of Medicine, University of London, in advanced training, and will assume his duties as Chief of Clinical Chemistry Service in February 1962.

Dr. Andrew C. Peacock, Chief, Clinical Pathology Developmental Research Laboratory, was appointed Assistant Chief of Clinical Chemistry July 1, 1961, and assumed the duties of the Chief of Clinical Chemistry during Dr. Cotlove's absence. Dr. Peacock reorganized the technical staff, providing a greatly increased work capacity and improved morale. He reviewed several of the more difficult technical methods and greatly improved our understanding and performance of these methods. His thorough knowledge of chemistry, wide experience, and understanding nature, have earned him the respect and affection of the entire Clinical Chemistry staff.

Dr. Viola Mae Young was appointed Acting Chief, Microbiology Service, effective July 1, 1961. The Microbiology Service has long suffered from the lack of a fulltime Chief with the result that technical growth did not develop in parallel with the rest of the Department. Dr. Young immediately grasped the overall situation and reorganized the staff to include a group for research and development. She has improved some of the existing methods and has added several new procedures during her short time in the Department. Her firm but gentle handling of personality clashes has improved the morale of the technical staff. Her contributions both as a scientist and as a leader are exemplary.

Dr. Gareth P. Gladstone, Reader in Bacteriology, Sir William Dunn School of Pathology, University of Oxford, England, completed his assignment July 31, 1961 as Visiting Scientist in Microbiology and returned to England. Studies on leukocidin initiated during his tenure are being continued by Mr. Hochstein in this Department.

Dr. Iain MacIntyre, Lecturer in Chemical Pathology, Hammersmith Hospital, Postgraduate Medical School, University of London, completed his assignment September 30, 1961 as Visiting Scientist in Clinical Chemistry and returned to England. His broad experience and depth of knowledge made excellent contributions to this Department. His suggestions lead to a more effective program of Quality Control and his research studies on magnesium and aldosterone metabolism are being continued by collaborators in this Department.

Dr. William B. Mason, Associate Professor of Biochemistry and Medicine, University of Rochester School of Medicine, joined our staff as Senior Fellow in Clinical Pathology effective July 1, 1961. He is reviewing all types of laboratory automation methodology and systems in medical, research and industrial laboratories with a view to developing more useful and efficient

automation and organization in Clinical Pathology.

Dr. Yasukazu Tanaka was appointed Visiting Scientist in Electron Microscopy effective July 1, 1961 by the Diagnostic Research Branch, NCI.

Dr. H. H. Marsh was appointed Assistant to the Chief of Clinical Pathology Department, effective July 1, 1961.

Dr. Stephen Robinson was appointed Assistant Hematologist effective July 1, 1961.

Dr. Edna Schnaper resigned as Acting Chief, Microbiology Service, June 30, 1961, to return to home duties.

Dr. Philip Geisler resigned June 30, 1961 as Assistant to the Chief of Clinical Pathology Department, to pursue investigative work in Hematology at Jefferson Medical College.

Dr. J. Russell Little resigned as Assistant Hematologist June 30, 1961 to become Chief Resident in Medicine at the Barnes Hospital, St. Louis, Mo.

Dr. Robert Fouty completed his second year of residency in Clinical Pathology on June 30, 1961 and began his training in Anatomic Pathology at the University of Washington, Seattle, Washington.

Drs. Paul Schmidt, Jack Lasersohn and Donald Kundel joined the resident staff on July 1, 1961. Drs. Geoffrey Brittin, Thomas Liddy and Coleman Seskind remained as senior residents in Clinical Pathology.

OFFICE OF CHIEF

Administrative duties have occupied 47 of an average 55 hour week for the Chief at his desk. His research was necessarily neglected except during the summer months when he was able to spend about 10 hours each week in the laboratory. Development of the data handling system occupied five hours, the major effort on this project being carried by Dr. Peacock, Acting Chief, Clinical Chemistry. Of the 55 hour week

Administration	85%
Development	10%
Research	5%

There was no technical assistance available to assist the Chief in his research after the first three months of this year except for a very fine summer student (medical) from June to September. The pressure of work in the service laboratories and shortage of technical staff prevented permanent assignment of technical assistance to him or to any of the Service Chiefs. One each was assigned to the Visiting Scientists in Chemistry and Microbiology, and NCI provided a technologist for their Visiting Scientist in Hematology.

The Deputy Chief, Dr. Brecher, averages 48 hours each week in the Department,

but administration of Hematology and Resident Training occupies at least 75% of his time.

The Acting Chief of Clinical Chemistry found it necessary to curtail his research drastically and devoted almost 100% of his 40 hour week to administration, reorganization and development of the data system.

Dr. Young, Acting Chief, Microbiology, devoted 90% of her full week to Administration including badly needed reorganization, modification of tests, personnel problems and work for the Clinical Center Infections Committee.

The Chief's Assistant, Dr. Marsh, has grown remarkably in his new duties and attained ability in administrative procedures. He has had complete responsibility for the Resident Training Program which he has improved significantly. About 75% of his efforts have been administrative including training in this area.

The devotion of our senior staff is unexcelled, but they are entitled to much more time for independent research. Each is a capable and outstanding investigator in his field and we are losing their contributions by permitting administrative pressures to curtail their laboratory work. We need an assistant chief for each to permit their return to half time research. Furthermore, we are in grave danger of eventually losing them to better opportunities for research if we continue to fail in providing that opportunity. The one obstruction to providing assistance is SPACE. Each is already sharing his office with technical staff or residents.

CLINICAL CHEMISTRY

Workload

During 1961 Clinical Chemistry performed 50% of the total workload of Clinical Pathology, i.e., 220,040 tests, with 41% of the technical staff. This 9% increase in work was accomplished without increase in technical staff and was made possible by full exploitation of improvements in organization of workflow and automation.

Organization

Dr. Andrew Peacock reviewed in detail the functional requirements and reorganized the staff, work operations, and recording and reporting system to greatly improve efficiency and morale in Clinical Chemistry. The technological staff was divided into five teams each supervised by a team leader to more efficiently handle chemical procedures grouped according to methodology, complexity and performance time. The reorganization encouraged each technologist to develop a high degree of skill and understanding in the tests performed, resulting in a greater capacity for work and a higher degree of accuracy. The delegation of responsibility to the five team leaders developed team spirit and healthy rivalry, improving morale particularly through the months of peak workload. Changes in the recording and reporting system eliminated several sources of transcription, and reduced confusion

Special Projects

Clinical investigators frequently need a set of repeated chemical analysis on a small group of patients in a pilot study to determine the value of a proposed investigation. It obviously is not economical for each to establish procedures, purchase equipment and employ technologists until justified by promising results of the pilot study. We are requested to perform these tests. Any one project does not unduly overload our laboratories, but because there are many they produce a significant total. Whenever feasible within the talent and available resources of our Department, we attempt to assist these investigators. This is properly one of our functions in a research hospital. However, we must decline most of these requests because of space and personnel limitations. Some in which we have been able to cooperate are: Neutral 17 keto and 17 hydroxy steroids for Dr. Liebow, NIMH; fecal electrolytes on patients receiving Amphoteresin B for Dr. Hill, NIAID; urinary alpha amino nitrogen for Dr. Rosenberg, NCI; serum calcium and magnesium for Dr. Oppelt, NCI, etc.

Visiting Scientist

Dr. Iain MacIntyre, Lecturer, Department of Chemical Pathology, University of London Postgraduate Medical School, joined our departmental staff in Clinical Chemistry from January 1 to October 1, 1961. His wide experience in practical clinical chemistry and expert knowledge of electrolyte biochemistry and physiology stimulated our staff and contributed much to our thinking, work, and resident training program. He was in constant demand for consultations, conferences, and speaking engagements on magnesium metabolism, physiology, and analytical methodology. Dr. MacIntyre set up accurate magnesium and calcium flame photometry for our laboratory, and investigated extensively the influence of magnesium deficiency on aldosterone production in adrenals of laboratory animals. He perfected an elegant technic for canulating the adrenal vein in white rats, and an isotope method for determination of aldosterone.

Dr. William Mason is comparing the accuracy, sensitivity and facility of atomic absorption flame photometry of magnesium and calcium with present methods of emission photometry. His major contribution is in reviewing the present status of clinical chemistry in relation to medical needs and the needs for development during the next several decades. Clinical Chemistry continues to consist of a relatively few determinations performed at an ever increasing rate but poorly controlled. He sees the need for a realistic balance between 1) performance of patient care service tests, 2) systematic study of existing procedures to determine their true worth in detecting disease and evaluating therapy and health, 3) development of more precise and less laborious methods for present tests, 4) development of analyses for constituents not now being measured and 5) research in clinical chemistry. For example, breath analysis is virtually unknown but should yield much new useful information by technics such as gas chromatography.

Special Problems

Almost daily requests for new tests well within the capability and service

responsibilities of the Clinical Chemistry Service must be refused because of inadequate space to set up the methods. Many of these are tests provided in progressive medical school hospitals and even in larger Army, Navy and Air Force Hospitals. Such tests are meticulous, time-consuming, not immediately subject to automation, and require additional staff; e.i., fractionated steroids, vapor pressure osmometry, several enzymes, beta lipoproteins, etc.

The increasing use of experimental drugs in leukemic children, and the necessity of preserving the veins of older patients require that we test finger blood whenever possible. The Sanz apparatus, as manufactured by the Beckman Spinco Company, has proven satisfactory for a few ultramicro determinations, but many other needed analyses must be developed. By October we were finally able to assign a competent technologist to complete the ultramicro tests, and she was well on the way to providing this service for cancer patients when her resignation (due to long delay in promotion) halted this effort until we can replace her and train the new person. This may require five or six months more.

The needs for new tests, further automation, and development are so acute that we squeeze more equipment into already crowded laboratories and add another person to cramped quarters. The Visiting Scientist's laboratory and the conference room have been converted to service laboratories. Additional space must be provided by expansion into other buildings, temporary loan of rooms from Institutes for our animals and developmental laboratories, rental space in nearby houses, or several trailer houses in the parking lot until adequate space can be provided by new construction in the Clinical Center.

Personnel

Technical staff shortage in chemistry is not acute at the moment, although we are carrying a larger than optimum load and have insufficient time to maintain complete quality control, and work on more than occasional automation problems. We need two or three more higher level technologists and a place to put them. Professional supervision occupies the full time of the Chief. He is entitled to time for research and study; otherwise he will become dissatisfied and seek better opportunities elsewhere. We need another Clinical Chemist as Assistant Chief to share the administration, professional supervision and training responsibilities.

Instrument Maintenance Laboratory

Last year, instrument maintenance, repair, and modification required provision of a laboratory for this function for which we procured an instrument engineer. Although he serves the entire Department, the larger number of problems are in chemistry and his supervision is best provided by the Chief of Clinical Chemistry. Maintenance of proper calibration and continuous use of our instruments have greatly improved, and breakdown time has been marked reduced by his activities. However, with increasing automation and instrumentation he is getting behind, and his small module

(170 square feet) is quite inadequate. This must be expanded and Mr. Eve will need an electronic technician soon.

Equipment

Projected equipment needs for ultramicrochemical procedures, development of automation and data processing and improved methodology include:

Autoanalyzer automatic chain (for 10-15 simultaneous tests)	$ 30,000
Coleman Automatic Analyses System	6,000
Gas Chromatograph	12,000
Ultra micro system	1,500
Serval centrifuge	1,000
Xray Fluorescence Spectrograph	20,000
IBM Data Processing Units (Rental)	3,600
Forms Burster	320
Desk Calculator	900
Oscilloscope	1,200
Automatic Amino Acid Analyzer	20,000

HEMATOLOGY SERVICE

Workload

The work volume in Hematology for 1961 was 34% of the total for Clinical Pathology with 35% of the technical staff. 156,048 tests were performed, an increase of 17% over 1960. 1,064 bone marrow punctures were performed and the specimens examined, 25% more than the previous year. In addition, there was an increase of 100% in the number of bone marrow slides submitted for consultation. The many transfusions of platelets by the National Cancer Institute to thrombocytopenic patients with acute leukemia have caused a marked increase in platelet counts requested of us. The necessity of counting platelets one hour following transfusion has substantially increased the number of counts performed after 5 p.m., constituting an overtime problem.

Developmental Research

Dr. Brecher has extended the clinical usefulness of the Coulter Electronic Cell Counter Model B which automatically and rapidly graphs the frequency distribution curve of a red cell population counting 2000 to 3000 cells for each size limit. The several different size populations present in certain anemias (combined iron deficiency and Sprue, macrocytic anemia, etc.) constitutes clinically valuable information important not only in diagnosis, but also in evaluating the progressive response to treatment. Another exciting contribution is the unique findings of a large cell component in reticulocytosis leading to fundamental biological knowledge concerning marrow response.

Dr. Thomas Liddy, Resident, is evaluating the clinical usefulness of the

electronic hematocrit, and investigating the glycogen content of lymphocytes in leukemia and related diseases.

Dr. Geoffrey Brittin has performed a preliminary evaluation of the clinical usefulness of ultrasonic viscosimetry in the study of blood coagulation. The changing viscosity of blood during coagulation was compared with the silicone clotting time as a screening procedure for bleeding diatheses, and with the thrombin time as an index of heparin neutralization following use of the heart-lung pump.

Special Projects

Dr. Y. Tanaka, guest Hematologist supported by the NCI, has initiated electron microscopic studies of the ultrastructure of leukemic cells, and the morphology of plasma cells in multiple myeloma and Waldenstrom's macroglobulinemia. He is also investigating the relationship of these latter two diseases. In a collaborative program with NCI, an RCA electron microscope was transferred to this Department and installed in a storeroom module without windows. The accessory equipment was also provided, as was an electron microscope technologist.

Dr. G. Brecher and Dr. J. R. Little investigated the lifespan of lymphocytes utilizing continuous intravenous injection of tritiated thymidine into rats by means of an osmotic pump. They procured conclusive new evidence that the lifespan of the small lymphocyte is greater than 100 days.

Dr. Stephen Robinson, Assistant Hematologist, is continuing the studies on the lifespan of lymphocytes, using radioactive techniques and cross transfusion experiments in the rat.

Dr. Tanaka and Dr. Brittin have studied the nature of previously undescribed intranuclear inclusions found in plasma cells of some patients with multiple myeloma. In progress are histochemical studies to identify the nature of the protein in these cells.

In collaboration with Dr. Robert Levin, NCI, Dr. Brittin has studied the sequential changes in the bone marrow of patients with acute myelogenous leukemia during therapy with "methyl-GAG." The pattern of change in the bone marrow during remissions induced with "methyl-GAG" has been found to differ from that seen in remissions induced with GMP and Folic Acid antagonists.

Special Problems

Space: As described above, crowded conditions are acute in Hematology. We need more technical personnel to staff development of automation, but there is no room for instruments or people. The Chief must share his office with the resident and a technologist, and hold his private

consultations with patient-care physicians in the corridor. There is no room for an Assistant Chief, much needed to help relieve Dr. Brecher of supervisory and training duties.

Personnel: To provide for increasing work, white counts and platelet counts needed at night for leukemic patients receiving platelet transfusions, and continuing evaluation of the blood clotting status of cardiac post-operative patients, at least one night technologist is needed. One part-time night technologist was employed during part of the year but resigned to return home to her family, and we have been unable to replace her.

New tests in Hematology are persistently requested, but we cannot provide them under present conditions. Some are needed occasionally but urgently and other should be added to our routines; such as protoporophyrin and coproporphyrin analyses, Vitamin B_{12}, red cell glucose dehydrogenase, other enzymes of red cells and leukocytes, etc.

Equipment

DU Spectrophotometer	$ 5000
Autoanalyzer	5000
Water Bath	300
3 Auto diluters	750
Microscope	800
Prothrombin Timer	750

MICROBIOLOGY SERVICE

This Service performed 16% of the Clinical Pathology workload by procedure count, 72,990, utilizing 24% of the technical staff, but it must be remembered that all microbiological procedures except serological and agglutination tests are much longer and more time consuming than the majority of chemical tests. Cultures of one sputum, urine, or exudate specimen usually require media plates, tubes, some chemical tests, and morphologic observations to isolate and identify the several important organisms which are present. The workload remained stable for the first half year but grew remarkably starting in August, chiefly because of two factors: the increasing confidence of the patient-care physicians in our Acting Chief, Dr. Young, who joined our Department in July and immediately established her outstanding competence, and a special epidemiological study of staphylococcal carriers among surgical patients and staff. The resulting volume of work exceeded that of the average for 1960 by 16%. Dr. Young's leadership in motivating her staff, loyalty to the cause of superb patient care and ability to organize the work and the hours of overtime of our technologists accomplished this task without proportionate increase of technical personnel.

Organization

Mr. Hochstein, M.S. Bacteriology, and experienced in our service operations, was promoted to Supervisory Bacteriologist on July 1, 1961. He is developing rapidly into a quiet, but effective and able supervisory as well as

being a competent bacteriologist. Dr. Young further promoted efficiency by assigning developmental research responsibilities and supervisory consultation duties to a team consisting of Mr. Zierdt, Dr. Ryschenkow and Mr. Bladen. She and Mr. Hochstein have modified the laboratory and operational staffing structure, dividing the group supervisory duties and work. Work capacity and morale have improved significantly.

Developmental Research

Automation in a traditionally biological area is a pioneering effort. We have not had the budget to obtain several desirable automatic instruments for adaptation to bacteriological and serological procedures, although this was planned for 1961. Also the workload has precluded such developments. Nevertheless, ideas have germinated from our work problems and devices are being planned, and if we can purchase the several instruments listed below, and one in Chemistry (Xray spectrograph), we hope to report significant progress next year. There is great promise in the automation of microbiology.

One exciting development by Mr. Bladen is a plate method for rapid determination of biochemical characteristics of bacteria. The time for identification after initial isolation is reduced from 18 to six or seven hours. He also suggested a project to develop gas chromatography for rapid identification of specific and characteristic lipids either produced or metabolized by organisms in culture. This would significantly simplify identification and contribute to new biochemical information for classification of pathogenic organisms. An extension of these notions include the use of Xray spectrography to quantitate specific elements in bacteria or viruses and their metabolic products. This whole area of development is so stimulating that investigation should not be delayed.

New Tests and Special Projects

Examination techniques for fecal parasites were improved and resulted in a considerable increase in protozoa identified.

Procedures for studying and reporting enteric organisms were modernized. Fecal samples from children under two years are examined for enteropathogenic Escherichia coli. Enteric bacteria are now reported more specifically (classification of organism as "paracolons" is now obsolete). An agar plate method for the demonstration of desoxyribonuclease (DNase) activity by Staphylococci is reported by several investigators to correlate with coagulase activity, as an index of pathogenicity. Extensive comparative testing of the two methods in this laboratory has confirmed these reports. We will replace the coagulase test with the D-Nase test, which is superior because it utilizes a specific substrate related to important cell material and is more rapid and accurate.

Clinicians of NIAID requested serum complement titers for better evaluation of chronic infectious diseases. After a favorable pilot study this test has been established as part of our routine service.

Mrs. Kenton continued studies with fluorescent antibody techniques to establish rapid identification of bacteria recovered from infections. This procedure has been adapted for use with Streptococci, Treponemes and Cryptococci. The fluorescent antibody technique is one of the most promising approaches to the problem of rapid, inexpensive identification of bacteria.

The Microbiology Service cultured patients, personnel, equipment, clothing, and the operating room, in collaborative studies with the Sanitary Engineering Branch to cover all possible sources of contamination preceding and during a series of 25 heart operations involving the heart-lung machine. The studies revealed rather frequent wound contamination, but no easily controlled cause of such contamination. It was concluded that only a broadly based program of attention to meticulous cleanliness and a number of more specific measures could reduce many sources of the contaminating bacteria.

A collaborative study with Dr. B. Tynes, staff member of NIAID, determined no significant contribution by anaerobic bacteria as causative agents of pyelonephritis. A carefully controlled anaerobic technique was applied to a large number of urine samples.

Staphylococcal skin infections following use of braided metal sutures are observed much more frequently than when monofilamentous sutures are used. Dr. Crawford of the National Cancer Institute is collaborating with Mr. Zierdt of our Service in an experiment testing in dogs such sutures impregnated with various Staphylococcal species.

The Microbiology Service prepares a weekly Infections Report of patients and employees for the Clinical Center Infections Committee. The Clinical Pathology Resident in Microbiology screens daily all laboratory reports and identifies those patients with pathogenic organisms. Each such case is reviewed with the patient's physician, if necessary, and the status of infection is recorded on the report. In this way the Infections Committee maintains close surveillance of hospital infections, discovers the spread and source of any hospital acquired infections, and can institute control measures before epidemics start.

Visiting Scientist

Dr. G. P. Gladstone, with the assistance of Mr. Hochstein, developed a rapid method for the assay of anti-staphylococcal leucocidin in human serum which can be used for routine diagnosis. He applied the test to survey the serum antibody titers of Clinical Center patients with staphylococcal disease, and of carriers and normal individuals. There is evidence that the test may have diagnostic value in cases of deep seated infection in which no organism has been isolated. He collaborated with Dr. Stuart Mudd of the Veterans Hospital and University of Pennsylvania Medical School, Philadelphia, in an assessment of the value of the vaccines in Staphylococcal infection. He developed a means of measuring the specific type of Staphylococcal antibodies produced either during infection or produced in response to immunization against Staphylococci. Staphylococci produce

a toxic substance which is lethal for human leucocytes. The results of the first portion of the study are being published in the British Journal of Experimental Pathology in an article entitled "The Assay of Anti-Staphylococcal Leucocidal Components (F and S) in Human Serum." In the second part of the study the method of assay was utilized to follow the efficacy of various Staphylococcal vaccines. These data will appear in the same journal in an article entitled "Titrations of Antibodies against Alpha-Haemolysin and the Components of Staphylococcal Leucocidin in Human Subjects following Immunization."

Special Problems

Space

This constitutes as much of a problem as in other Services. Since Dr. Gladstone, Visiting Scientist from Oxford returned home, work necessarily has expanded into the module he shared, so it is no longer available for two outstanding Clinical Pathologist-Bacteriologists, Dr. Ericsson of Karolinska Institute, Stockholm, and Dr. Emil Bogens, Emeritus of University of California, each of whom would accept an invitation to work with us three to six months during 1962.

Personnel

There is need for an Assistant Chief in Microbiology, an experienced clinical microbiologist, so the Chief and Assistant can share the growing supervisory responsibilities and devote some of their time to developmental projects and research. Mr. Bladen, M.S. Bacteriology (and candidate for Ph.D. June 1962) resigned December 31 to accept a better position in NIDR. Several more technical staff (5) will be required in 1962 to carry the increasing load. One of these must be a night technologist to perform emergency cultures, continue certain culture studies during the night, to facilitate more rapid reporting of pathogens to patient-care physicians, and for handling left-over routine work from the day shift.

Equipment

Cold Chest (-70°C)	$ 1,200
Inverted tissue culture microscope	1,000
2 standard microscopes	1,600
Autoanalyzer	5,000
Water Bath	300
Xray Fluorescent Spectrophotometer	(see Clinical Chemistry)
Gas Chromatograph	" " "

RESEARCH AND DEVELOPMENT PROGRAM

Automation and Data Handling

The customary procedures for handling specimens, requests, calculations, checks, and reports of test results which grew "like Topsy" independently

in each Service laboratory, became increasingly cumbersome and inadequate as work volume increased and automation made analytical processes more efficient. Paper work became the inefficient bottleneck in our operations and demanded attention. The current methods for paper work and their relation to analytical operations were thoroughly reviewed, and the basic functional needs studied by our staff in collaboration with members of the Management Policy and Computation and Data Processing Branches. It was determined that our functions would be served best and most efficiently by fulfilling the following requirements in a data handling system:

1. Place no greater burden on patient care physicians or nurses than the present system.
2. Relieve technologists of most clerical work.
3. Provide a control record immediately upon receipt of specimen to facilitate distribution and scheduling of the day's work.
4. Expedite distribution, insure completion of requested tests and assure prompt and accurate reporting.
5. Accommodate to marked fluctuations in rate and flow of work.
6. Eliminate necessity for repetitious transcription of result data.
7. Provide rapid storage and retrieval of data.

With these requirements in mind, a review of the available devices proved that a punch card system was most economical and adaptable to our needs. With the cooperation of Management Policy Branch and systems engineers from IBM, a paper work and specimen identification plan was devised utilizing available relatively simple IBM equipment. It includes use of mark-sense request cards by physicians, mark-sense test results records by technologists and print-out of reports. This system is readily adaptable to the computer data processing planned for a later date. Trials using sets of request and test result cards representing an average days work in Chemistry, and run through at the demonstration rooms of IBM, indicate that we can anticipate two or more hours saving of technical staff time each morning, and equivalent time of three technologists each afternoon; analytical operations can be started earlier each day, and reports can be printed and delivered rapidly several times each day. Transcription errors will be eliminated and current Daily Summary Cards will provide rapid retrieval of information for statistics, correlative studies and immediate reference for evaluation of patient progress. Soon after establishing this system in chemistry we will start developing modifications to include specimen handling, testing, and reporting in the Hematology and Microbiology Services. We hope within one year to have an efficient central paper work operation for the whole Department. More specific items of research and development are included in descriptions of individual Service operations below.

COLLABORATIVE RESEARCH AND DEVELOPMENTAL PROGRAM WITH DIAGNOSTIC RESEARCH BRANCH, NCI

Discussions and planning during the last eight months of this year led to a collaborative program between this Department and the Diagnostic Research Branch, NCI, for joint research in clinical pathology procedures, automation and laboratory data processing. The search for diagnostic information re-

lated to neoplastic disease involves host health, chemical and physiological history and reaction to environment. The multidisciplinary scientific approach epitomized in Clinical Pathology promises effective studies in these areas. Application of computer technics are necessary for both the processing of large amounts of analytical data on one individual for determination of characteristic patterns, and retrieval and correlation of laboratory data in population studies. Only by sophisticated instrumental automation can laboratories cope with the tremendous load of analytical work which would ensue from a diagnostic breakthrough.

Specifically, our collaborative program completed the development on contract with Bolt, Beranek, and Newman, and evaluation of the Automatic Digital Readout Colorimeter, and developed an IBM laboratory request, data and report handling system. The latter will be instituted in the next few months. We have also initiated a contract for development and fabrication of an automatic specimen handling and analytical instrumental system with digital readout compatible with the IBM and Honeywell 800 Computer for computation, collation and printing of reports.

RESIDENCY TRAINING

The unique situation of this laboratory in a clinical research environment provides ideal training for outstanding leaders in Clinical Pathology, both in the Service and in academic institutions. The Training Program presently provides basic training to six residents in a two year program. The volume of material in the Department is sufficient to train 10 residents, but without laboratories for them and more professional staff to share the training load, it is impossible to accept more men. There also is need beyond the basic two years, for a third year of experience to provide some degree of expertness in at least one field, such as clinical chemistry or microbiology. Our "graduates" write back urging that we increase also training in laboratory management and design.

SPECIAL PROBLEMS

Space

The amount and design of space for Clinical Pathology originally provided was 9000 square feet, planned for a workload of 120,000 tests per year. By 1958 the test volume had grown to over 210,000 and acute space shortage made further expansion of service physically impossible. An additional 1000 square feet were provided which, with the advantages of partial automation, was estimated to support a workload of 240,000 tests. During the past three years our load has increased to 450,000, almost double the optimum work density for adequate quality control, instrumentation and related developmental and training programs. For this load we need a total of 16,300 sqaure feet of service area. This does not include another minimum of 4000 square feet needed for Clinical Pathology Research and Development.

The laboratory workload for a stable research patient census of 410 is growing at the rate of 12% to 15% each year. Without doubt this and the volume

of tests for the Employee Health Evaluation Program will produce a workload of 900,000 or more in five years (1967). By then our space needs will be 30,000 square feet to adequately support service, research and training. Floor plans for this space are being prepared for submission during the coming year.

The following acute shortage conditions are not surprising in view of the 450,000 test load in 10,000 feet:

Dr. Brecher, Chief of Hematology, shares a small office laboratory with one resident and frequently a technical assistant. He cannot discuss problems with an assistant, technologist or a physician privately without the necessity of the others leaving and interrupting their work.

Dr. Robinson, Assistant Chief, Hematology, shares a module with the Service secretary and two clerks.

Dr. Tanaka, Guest Visiting Scientist in Hematology, has to himself a small table in the corner of the Electron Microscope Laboratory and dark room.

In Clinical Chemistry conditions are similar:

Dr. Cotlove, Chief, shares a module with technical staff; the Assistant Biochemist shares with the Supervisory Technologist and a resident, and the other resident has a small corner in a laboratory. Dr. MacIntyre, our guest scientist, was forced to work in a crowded laboratory, and since his departure that space has been used for service expansion. There is no space whatever available now in Clinical Chemistry for a visiting scientist.

In Microbiology, Dr. Young, Chief, shares her office with technical staff; there is no space for residents; our guest bacteriologist, Dr. Gladstone from the Sir William Dunn School of Pathology, Oxford University, shared a module with two technologists and often with a resident. Necessary service increases which have been marked in Microbiology filled this space immediately after he left, and it is no longer available for another visiting scientist.

Dr. Mason, Senior Fellow in Clinical Pathology (Director of Clinical Laboratories, Rochester University School of Medicine), must do most of his work in his apartment because there is inadequate space here.

Although Residents and Clinical Associates in other departments usually are provided offices and laboratories, rarely requiring more than two to occupy one module, there is no such space in Clinical Pathology for this most important training program. It is necessary to crowd the junior residents into the service laboratories and the chief residents in with laboratory chiefs or their assistants. In no other department is this true. Our training opportunities are in much demand and the material readily available would support training of eight or ten residents but space shortage precludes this desirable contribution to pathology.

For the third time since 1955, Management Planning was invited to assist us in reviewing space utilization. They studied our operations under increased load and suggested more efficient space and equipment arrangements. Reorganization of operations, especially in Chemistry and Microbiology, has contributed to more efficient crowding.

Nevertheless, it was necessary to obtain more space for service operations and finally our senior staff very reluctantly decided to sacrifice our conference room. It now will be necessary to try holding staff meetings, conferences, guest speaker seminars and other training functions in a borrowed conference room on another floor. We cannot afford to discontinue the valuable weekly advanced technology classes, professional seminars, and Laboratory Rounds which are so necessary for scientific growth of both our technical and professional staff and for their morale. Meeting in a remote room will hazard scheduling which is subject to priorities of the host department (NIMH). Furthermore, it will discourage attendance because of distance from our work and unavailability to answer phone inquiries of physicians.

The conversion of the conference room to laboratory modules was requested last April but shortage of funds, delays in ordering materials, and work priorities in other buildings have prevented completion which is expected in February 1962.

Another module would be available if the Chief of the Department could move his research laboratory into Cancer space. The research is supported by and oriented to the program of the NCI, but frequent and urgent requests for the space are denied on the grounds of space shortage.

Additional space needed to adequately support our current workload and training program include:

Clinical Chemistry	
Chief's Office	1 module
Chief's Lab	1 "
Assistant Chief's office-lab	1 "
Visiting Guest Scientist	1 "
Residents	1 "
Additional service tests	2 "
Gas chromatography development	1 "
New instrument testing & evaluation	1 "
Instrument maintenance & repair shop	1 "
Hematology	
Chief's Office	1 "
Assistant Chief's office-lab	1 "
Visiting Guest Scientist	1 "
Residents	1 "
New instrument evaluation	1 "

Microbiology		
Chief's Office	1	Module
Assistant Chief's office-lab	1	"
Visiting Guest Scientist	1	"
Residents	1	"
Supervisory bacteriologist & special tests	1	"
Additional tests	1	"
Development of automation	1	"
Virus, neutralization tests, etc.	1	"
Departmental		
Central Specimen & Data Processing	1	"
Assistant Chief of Dept - office	1	"
Fellow in Advanced Clin.Pathology	1	"
Exchange Pathologists (Refresher training)	1	"
Conference Room (restore)	2	"
Chief's research lab	1	"
Xray fluorescence spectrg.		
	30	"

Personnel Actions

Under conditions of lower pay than in private hospitals, restricted advancement opportunity (Technology grades 7 to 9), heavy frustrating workload with daily emergencies, and the immediate competitive environment of easier work, shorter hours and higher grades in the Institute research laboratories, morale of our technical staff is difficult to maintain with our best efforts. The case of one illustrates the demoralizing effect of delays. She was contacted directly in November and told she could not be promoted from GS-6 to GS-7 until February 1962. Discouraged, she immediately sought employment elsewhere without telling us of her discouragement or intent. Another Public Health Service agency offered her immediate employment at GS-7. In the meantime, since July she was receiving training in and setting up methods for ultramicrochemical analyses on finger-stick blood for the children on the Leukemia Service of NCI. We were committed to provide this important and long needed service by January. Because Personnel did not have time to properly study and process this promotion action, we have lost an excellent and capable worker, our ultramicrochemical service for leukemic children has been delayed until another can be trained (5-6 months), and Personnel will have to devote much more time in recruiting a replacement. It is recommended urgently that the Personnel Office be staffed to provide prompt, helpful action and that their personnel contacts be positive and encouraging. Loss of valuable technical staff and the subsequent cost of replacement are certainly not economical operations.

Personnel Recruitment

Because our personnel ceiling is never equal to the carefully calculated technical needs based on service workload, (operating at 41 tests per technologist per day compared with optimum of 35), we have no buffer for excessive sick leave during winter months or periods of loss of staff due to resignation and long maternity leave. The lapse between loss of a technologist and replacement is two to three months. There are recruitment actions dated August, September and October, still unfilled. This situation includes clerical staff. Only for a short time during the year did we have all of our too few clerical positions occupied. Yet we are not permitted to advertise and compete equally with outside job opportunities. The Civil Service Registries when operating are filled with dead wood.

A particular problem is recruitment of night technicians. The amount of night emergency work and left over work from the day's routine requires at least three full time staff, but spontaneous applicants for these positions are rare.

Travel Funds

One of the responsibilities of a department of the National Institutes exercising leadership in an area of medicine is participation of its Chief and staff in national and international scientific meetings, national scientific and medical committees, and personal conferences with other pathologists and related scientists to exchange current methods and ideas. An isolated worker soon becomes sterile. Clinical Pathology covers the wide range of human health and medicine; it involves the application of all basic sciences and techniques. Therefore, clinical pathologists and their fellow staff scientists cannot maintain leadership or remain in the frontier of advances unless they are active in the many related organizations and meetings. These include Clinical Pathology societies, National and International Committees, BioMedical Association (Electronic and Computer applications), the College of Pathologists, especially the Section of Governmental Pathologists, the Associations of Clinical Chemists, Clinical Bacteriology and Microbiology, Hematology, Histochemistry, Cytology, Immunology, and various seminars and symposia on methods, instrumentation, automation and related research.

During fiscal year 1961, available travel funds were exhausted by February and considerably embarrassed the Department in committments to present reports of our work. We had approved Mr. Zierdt to attend the meetings of the Society of American Bacteriologists and present his work on a new method for the bacteriophage typing of staphylococci and a exhibit and demonstration of the technique. When his travel was disapproved for lack of funds, travel support was ought and obtained from NIAID.

The Department Chief had five committments of which four had to be cancelled or funds obtained elsewhere. For the other members of the senior staff (4) of 12 meetings, committments or invitations, seven could not be provided and we could allow only expenses for one resident and perdiem for two others to attend one meeting. The Deputy Chief, Dr. Brecher, has had to arrange

travel support from NIAMD. Ten of the staff attended 13 meetings at their own expense.

For the current fiscal year, travel support is limited to $2600. For our professional staff of 17 physicians and scientists this averages $150 each, sufficient for one meeting or laboratory visit of three days at moderate distance. Again this year members of our professional and technical staff will be forced to attend necessary meetings at their own expense. One international congress or several necessary committee meetings and conferences for one staff member leaves little for the rest of the staff. There should be budgeted for a department as large and professionally active as ours, a minimum of $1000 for the Chief, at least two meetings for the Deputy and Service Chiefs, one meeting for each junior staff and the residents and sufficiently more to support a number of trips to committee meetings or visits to other laboratories and industry for technical purposes. This would require $4500 to $5000.

FUTURE PLANS

1. Clinical Pathology Laboratory support to clinical research will continue to be provided at the highest level of quality attainable.

2. Research in and development of automation and data processing will continue on an accelerated basis to increase our capacity and efficiency. We plan to centralize paper work and specimen handling to serve all three laboratory Services.
   This program, particularly in Clinical Chemistry, is a joint effort with the Diagnostic Research Branch, NCI, which is financially supporting the developmental contracts and has assigned Dr. Peacock and his staff to this program. There is real promise of successful automation to increase our capacity in chemistry four or five fold and release technical staff for more meticulous analyses, additional non-automated tests, and further laboratory development and clinical pathology research.
   Xray Fluorescence Spectrography is one of the most exciting new analytical tools which can be adapted rapidly for ultramicrochemical analysis and has excellent potential for automation.
   We will start automation in Microbiology, where all procedures are still meticulous and laborious; and initiate similar efforts in Hematology.

3. The Employee Health Evaluation Program for which we have been preparing examination methods, recording system, and detailed plans will be started. We should be able to examine and document the physical and laboratory patterns on 500 selected employees during the next calendar year. The plan calls for adding 1000 more each year thereafter, to a total of about 2500 or 3000.

4. Specific plans for immediate and future space requirements for adequate development of the Department will be made and submitted.

5. With the collaborative assistance of the Diagnostic Research Branch, NCI,

we will procure and evaluate the performance and reliability of newer laboratory instruments and provide the resulting information to Chiefs of Pathology of other Public Health Service Hospitals and to other scientists and physicians at NIH.

6. More effective and comprehensive quality control measures will be developed and applied to our examination procedures in all three Service laboratories.

7. The training program must be improved and expanded to include more residents to help meet the growing demand for exceptionally well trained leaders in our field. The unusual opportunities for advanced training in laboratory administration, automation, special laboratory tests and research potential in clinical pathology should be made available in refresher courses and exchange training for other pathologists in the Public Health Hospitals.

CALENDAR YEAR 1961

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Avge	Total
Average Pt	399.8	417.5	405.0	400.1	411.7	407.3	412	395	363	397	414	376	400	4798.4
Total Tests	35678	32419	37073	32606	39572	37814	37032	41880	38857	40208	38366	37573	37424	449,078
Test/Pt/Day	4.6	4.1	4.0	4.0	4.2	4.1	4.5	4.6	5.4	4.6	4.6	5.0	4.5	53.7
Test/Pt	89.2	77.5	91.3	81.5	96.2	92.7	89.8	101.6	109	101	92.8	100	93.5	1122.6
Total Staff	50.5	51.5	52.0	50.5	50.5	48.5	50.9	54.9	54.0	53.0	56	56.5	52.4	628.8
Total Equiv. Tech.	40.8	45.5	44.8	43.2	43.2	41.1	42.4	43.6	42.9	43.9	46.5	44.5	43.5	522.4
Test/Tech/Day	43.5	37.5	35.8	37.7	39.8	41.8	42.1	41.7	45.4	41.6	41.5	42.1	40.9	490.5

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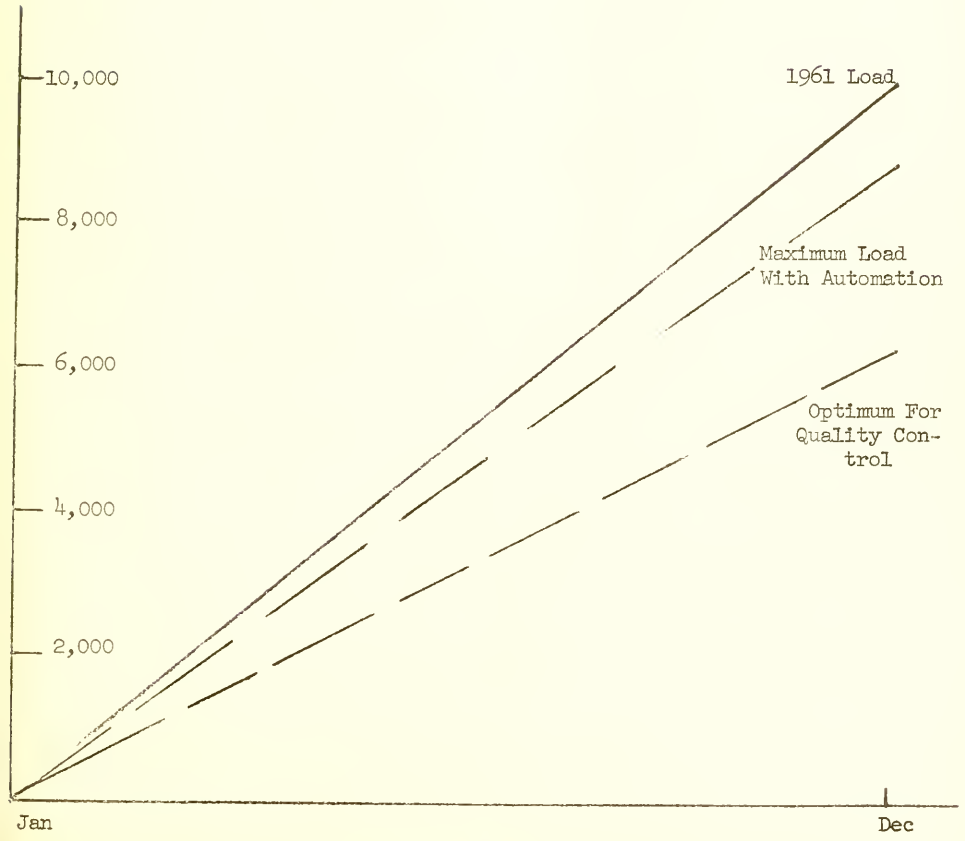
23a

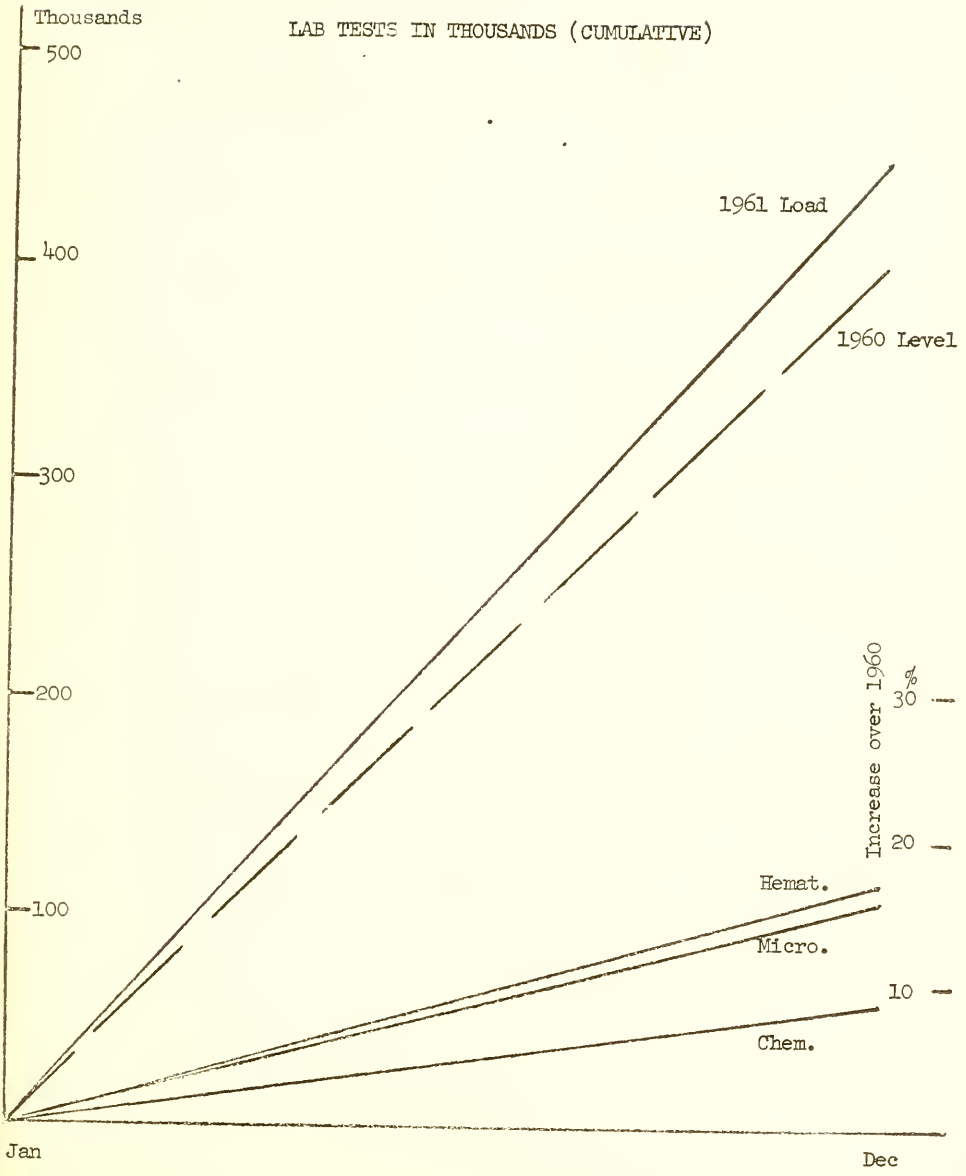
CALENDAR 1961

TESTS PER TECHNOLOGIST (CUMULATIVE)



CALENDAR 1961

LAB TESTS IN THOUSANDS (CUMULATIVE)



PUBLICATIONS

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Production, differentiation and lifespan of leukocytes. Brecher, George, von Foerester, H., and Cronkite, E. P. In Braunsteiner, H. (ed): Physiology and Pathology of White Blood Cells. Grune & Stratton, N.Y.,1961.

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Automatic Titration with Direct Read-out of Chloride Concentration; Cotlove, Ernest and Nishi, Hiroshi H. Clinical Chemistry 7: 285-291, 1961 June.

A Modification of the Klett-Summerson Colorimeter. Marsh, H. H. Technical Bulletin of the Registry of Medical Technologists 31: 217-218, 1961.

Size Distribution of Erthrocytes. George Brecher and G. Z. Williams. In "Applications and Methods of Counting and Sizing in Medicine and Biology", New York Academy of Sciences. In press.

Instrumentation for Time-Lapse Ultraviolet Television Microscopy, G. Z. Williams and R. G. Neuhauser. In "Scanning Techniques in Biology and Medicine", New York Academy of Sciences. In press.

Clinical Pathology Tomorrow, G. Z. Williams. Ward-Burdick Award Lecture. American Journal of Clinical Pathology. In press, March 1962.

Titrations of Antibodies Against Alpha-Haemolysin and the Components of Staphylococcal Leucocidin in Human Subjects Following Immunization. Stuart Mudd, G. P. Gladstone, Nancy A. Lenhart and D. Hochstein, British Journal of Experimental Pathology. In press.

The Assay of Anti-Staphylococcal Leucocidal Components (F and S) in Human Serum. G. P. Gladstone, Stuart Mudd, D. Hochstein and Nancy A. Lenhart, British Journal of Experimental Pathology. In press.

PRESENTATIONS

Determination of Lymphocyte Turnover by Continued Infusion of $_1H^3$ Thymidine. Brecher, George, Little, J. R., Bradley, T. R. and Rose, S. Proceedings of the 8th European Congress of Hematology. Basil, S. Karger, 1961.

Continuous Labeling of Bone Marrow and Peripheral Blood. Brecher, George. 8th European Congress of Hematology, Vienna, Austria, 1961.

Automation in Clinical Pathology. Williams, G. Z., Peacock, A. C. and Nishi, H. H. Mid West Society of Pathologists Meeting, Detroit, Michigan, February 1961.

The Optimal Single Phage Concentration for the Typing of Staphylococcus aureus. Zierdt, C. H. and Marsh, H. H. 61st Annual Meeting of the American Society for Microbiology, April 1961.

A Portable Laboratory for Remote Areas. G. Z. Williams. Pan-Pacific Pathology Congress. October 1961.

Automation in the Clinical Laboratory. Philip H. Geisler. Upper Midwest Hospital Conference, St. Paul, Minnesota. May 1961.

AWARDS

Mrs. Janet Rogers and Miss Anne Jennings: Letters of Commendation for Superior Performance.

Dr. G. Z. Williams, Recipient of Ward Burdick Award and Gold Medal from American Society of Clinical Pathologists for achievements in Clinical Pathology Research and Development.

CALENDAR YEAR 1961

PUBLIC HEALTH SERVICE NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

REHABILITATION DEPARTMENT

CC-38
Serial No.

During Calendar Year 1961, The Rehabilitation Department as in previous years continued to carry out its basic function of patient treatment, using recognized, effective measures of physical, occupational, and speech therapy. Again, a large number and wide variety of tests and measurements were carried out for Institute physicians primarily for evaluation of functional ability and progress, but also in connection with diagnosis and determination of effectiveness of drug and other therapy.

The numerous specific services provided by the Department are listed in detail in the Summary Annual Report for Calendar Year 1959 (pages 1-3) and are not repeated herein in the interest of economy of space.

SPECIAL PROGRAMS:

A number of special programs, begun in previous years, in which the Department collaborated with Institute physicians, were carried on during Calendar Year 1961:

1. Continued evaluation of the use of plaster casts and splints in the treatment of patients having rheumatoid arthritis.
2. Continued weekly measurements of joint range of motion and determination of joint range percentage deficits for rheumatoid arthritis patients on drug studies.
3. Continued pre- and postoperative evaluation and treatment of heart surgery patients. These patient referrals are primarily concerned with preoperative orientation and postoperative treatment to prevent loss of range of motion and help the patient achieve normal functional capacity.
4. Pre- and postoperative evaluation of patients having neurologic disorders considered appropriate for stereotaxic operative procedures. Rehabilitation Department personnel and the Neurosurgical Staff developed reasonably objective tests of functional activities. These tests, together with determination of muscle strength and joint range of motion measurements conducted pre- and postoperatively on each referred patient, are of aid in the evaluation of the postoperative status and surgical results. In Calendar Year 1961, the battery of tests was augmented by tests of upper extremity rigidity (fingers, wrist, elbow) using

a digital counter board. During this year, eighteen patients were evaluated.

5. Treatment of patients having cystic fibrosis using breathing exercises and postural drainage technics.
6. Evaluation of specific therapeutic measures in patients with psoriatic arthritis, including measurements of range of motion of joints of the fingers of both hands.

STAFF TRAINING:

In November 1961, Mr. Mario Salvanelli, Assistant Chief, Physical Therapy Service, and Mr. Lamont Smith, Supervisory Physical Therapist, attended the Institute for Physical Therapists in Miami Beach, Florida, for a one-week course in administration.

Also in November 1961, Miss Helen Applebaum, Assistant Chief, Occupational Therapy Service, attended a three-day Workshop on Prevocational Programs in Occupational Therapy at the Institute for the Crippled and Disabled, in New York City.

Throughout Calendar Year 1961, the Department provided orientation and training programs for its new staff members, and also participated in in-service training courses, orientation lectures, and Rehabilitation Department tours for a wide variety of Clinical Center personnel, including Practical Nurses, Gray Ladies, Head Nurses, Social Service Staff, Nurse Officers, Clinical Pathology Staff, and others.

A special one-day review of current programs and practices of the Rehabilitation Department was given on May 24, 1961 for the Chiefs of Physical Therapy from the Public Health Service hospitals throughout the country.

PUBLICATIONS:

1. "Strike Back at Arthritis," a 1960 PHS publication in whose preparation the Rehabilitation Department played a major role, reached a total sale of 53,527 by the end of Calendar Year 1961.
2. "Casts, Splints for Rheumatoid Arthritis," an article describing simple, effective forms of splinting for patients with rheumatoid arthritis, by Dr. D.M. Fried, Chief, Rehabilitation Department, Dr. Joseph J. Bunim, Clinical Director, NIAMD, and Mario L. Salvanelli and Vida Jo Niebuhr, Physical Therapy Service, Clinical Center, was published in the October 2, 1961 issue of MODERN MEDICINE.

SPACE:

In 1960 the loss of one module in Occupational Therapy Service (4th floor, D-wing); and one module in Physical Therapy Service (5th floor, D-wing), because of requirements in connection with the new Surgical Wing made necessary certain relocations and reconstruction. These were completed satisfactorily during the first half of 1961.

EQUIPMENT:

No major purchase of new equipment was made during the year.

PERSONNEL CHANGES:

A number of personnel changes took place in the Physical Therapy and Occupational Therapy Services with 4 resignations and 3 replacements. At the close of Calendar Year 1961, personnel of the Department totaled 23, with 2 vacancies in the Physical Therapy Service, and 2 vacancies in the Occupational Therapy Service.

PUBLIC HEALTH SERVICE NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

PHARMACY DEPARTMENT

CC-42
Serial No.

The Pharmacy Department is composed of the following services: Pharmacy, Central Sterile Supply, Pharmaceutical Development, Radiopharmaceutical, and the Office of the Chief. The Department activities have been expanded in the area of the Central Sterile Supply and Radiopharmaceutical Services and strengthened in the other Services. A 10.2% increase in services has been experienced by the Department during fiscal year 1961. The individual increases will be discussed in the various detailed Service reports.

PHARMACY SERVICE

The physical facilities improvement reported in 1960 was completed and was reflected in an increase in efficiency for personnel assigned to this area. The identical number of personnel were able to absorb an increase in workload and commented that the changes constituted an improvement in working conditions.

The total number of work units reported for the fiscal year increased by 73,383 units. This is not a wholly correct reflection since this resulted from an improved and more accurate reporting system. As compared with the 1960 report, there was an increase of 9,251 units. The additional 64,132 work units are being added to the report for the first time since it is composed of prepackaging and bulk compounding activities, which is work performed, but had not previously been reported. Where purchased items are dispensed, these are simply reported as a work unit. However, where items are bulk compounded or prepackaged and labeled, there is additional work which should be reflected in the report.

The variety of sterile ophthalmic dosage forms prepared in the Pharmacy has increased during the year. The process of quarrantining all sterile ophthalmic solution preparations for a ten day sterility test has been rigidly followed, except in a very few extemporaneously prepared solutions for immediate use. This is one of only a few pharmacies in the United States that has been offering this complete sterile ophthalmic service. Although it represents but a small number of reportable work units, it is of the utmost importance to the patients using the material.

The Department Catalog was revised during the last three months and will be ready for distribution early in 1962. The method adopted for reproduction of the catalog saved endless hours of retyping drug names and dosage forms. The 1960 catalog was the first pharmacy catalog in the eastern

United States to utilize the I.B.M. type cards, which are photographed by a high speed camera to produce a negative for the printing process. The time saving results from the fact that deletions from the catalog are accomplished by simply destroying the individual line cards, and additions require the typing of one line card for each line of printing along with the filing of these cards in the appropriate location. Recently this tystem has been adopted by several other hospital pharmacies as the method of producing their formulary.

Investigational drug dispensing has become a daily operation and accepted by the staff as a normal activity of the service. The names are new, but no more complicated than older drug or chemical names. At times, there is still a reluctance on the part of an investigator to give the Department personnel sufficient information. This problem will continue to need attention in order to assure the clinician of the confidentiality of the information.

CENTRAL STERILE SUPPLY SERVICE

The Central Sterile Supply Service issues have increased 8.5% during fiscal year 1961. This increase has now brought the units issued to 3,602,498, an impressive total. Undoubtedly, the total will rise very close to 4 million units in the coming years.

This increase has been absorbed by the present number of employees. However, it has been necessary to shift the working hours to include an additional person on week ends and another for evening hours. These shifts have reduced the number of daytime personnel available, making it more difficult to maintain excellent service.

The evaluation of new products is being continued. There are many new products which may have an application within the patient area so a considerable number of hours per week are spent in evaluation. Actual evaluations are arranged with the clinicians and nursing personnel after the products have passed basic requirements established by the Pharmacy Department. Among these requirements for sterile items are characteristics of the outer wrapping, ease of opening, and, if the product is sterile, when it is opened by the user. Proper packaging of items is a continuing and time-consuming project.

The 2 ml. glass tipped sterile syringes have been replaced with 2.5 ml. plastic disposable sterile syringes for all normal use. Sterile 2 ml. glass syringes will continue to be available for special uses.

An 8" x 10" sterile non-absorbable combine pad has been replaced with a sterile 8" x 7½" all-absorbent combine pad, resulting in two advantages: (1) more absorbency per pad, reducing the nursing time spent in changes per day, and (2) it is considerably lower in original cost. This is really a double saving when evaluated on the basis of the overall Clinical Center operation.

When evaluating products, the Pharmacy Department considers all other areas affected prior to consideration for final adoption.

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The item of service which requires most personnel time per unit of issue is the processing of special or custom made equipment and supplies. However, it is most useful for the clinicians in easing their difficult task of diagnosis and treatment.

A combination steam and ethylene oxide sterilizer was delivered and installed. This replaced a steam sterilizer which was not efficient due to size of the instrument. Many months were spent in getting the equipment to function properly and in stopping all gas leaks. Numerous small load runs were made with the ethylene oxide gas mixture to determine if the instrument would sterilize properly.

Samples for sterility tests were placed in six to ten locations within the sterilizer for each test run. When six successive completely sterile loads were obtained, the sterilizer was accepted. Each load is routinely tested for sterility with suitable spore test strips especially prepared for ethylene oxide sterilization.

The toxicity of plastics is being watched very carefully and progress toward finding an effective evaluation system is under way. This is being carried on jointly by the Radiopharmaceutical Service and by Dr. John Autian, plastic consultant from the University of Texas. The greatest difficulty has been to determine a fast method of evaluation. Another problem exists due to the fact that some of the plastics absorb drugs and chemicals and leach out plastercizers into solutions. An attempt is being made to use radioactive drugs for the leaching and absorption problem. It is too early to report any findings.

Our space problem is becoming more serious each year. The Surgery Packaging Area cannot be expanded further without additional floor space. If it becomes necessary to expand the Surgery Area, it will eliminate another area with consequent curtailment of some of the present operations.

Equipment for loan storage is highly unsuitable since it consumes the major portion of one employee's time by being so distantly located. This is an example of workload not increasing, but because of unnecessary elevator waiting periods in transfer of items, simply wastes an employee's time without any benefit to patients. Each of these small incidents subtracts time from service which should be available, but which must be denied because it is beyond the Department's ability to remedy. A clean cut policy should be established in the near future concerning the importance of patient care activities as it relates to space and functions of nonpatient care activities in Building 10.

PHARMACEUTICAL DEVELOPMENT SERVICE

This Service continues to be the problem area from a staffing point of view. It has been highly desirable to require the Chief of this Service to have the educational background of a Doctor of Philosophy degree in a Pharmacy-related speciality, but personnel with these qualifications usually demand a much higher salary than is available at the Clinical Center.

In order to ease this situation, one pharmacist has been approved to attend the Philadelphia College of Pharmacy and Chemistry to receive special training in formulation of new products, particularly concerning stability, compatibilities, and assays for new products of unknown shelf life.

The Department has been fortunate in bringing on duty a recent graduate in Pharmacy who will complete his graduate Ph.D. degree early in 1962. At this time, it is hoped he may serve as acting Chief of this Service; however, whether he will stay on duty will depend on many factors, one of which is salary comparison to industrial and college teaching offers.

The registration and processing of investigational drugs has been one of our most important functions during the past year. Many have been processed into new dosage forms prepared for the first time. Others have been registered, labels checked and approved or relabeled, control numbers added and then transferred to the Pharmacy Service where these investigational drugs have been routinely issued on prescriptions.

The most urgent need is identical to that reported in 1960, this is suitable space for the preparation activities of potent and toxic pharmaceutical products. An isolated room under negative pressure is urgently needed for this activity before permanent injuries result to some of the employees. Two preparations could not be processed in the Department due to their extreme toxicity, since there is no suitable facility available. It is not known whether these preparations were eventually obtained from an industrial source or not.

RADIOPHARMACEUTICAL SERVICE

The most rapid growth of any of the Services has been in the radiopharmaceutical area. The units of work load reported in no way reflect the contribution of this service to the clinicians. The staff required to attempt to fulfill requests now totals two full-time officers, a non-professional medical aid, and a half time clerk typist.

Many requests cannot be fulfilled due to three limiting factors:

(1) Insufficient Trained Personnel

Mr. Philip Hugill, a fully trained professional in the area of radiopharmaceutical preparations, was of great assistance to Mr. William Briner, Chief of this Service. However, he resigned from the PHS Commissioned Corps to attend graduate school. He has been replaced by Mr. Donald Hill, who has received only partial radioisotope training due to a shortage of training or travel funds. It will require a considerable length of time to fully train this officer, since he will only be attending courses offered in the local area, so as not to use travel funds. Additional daily on-the-job training is given by Mr. Briner; however, a more concentrated and formalized course is needed.

(2) Space

Space is a limiting factor which dictates the number of operations it is possible to perform. The space now occupied is unsuitable in many ways,

from a basis of safe operation, and limits the effectiveness of personnel. More suitable and increased space is now mandatory, otherwise a point has been reached, and surpassed, where no further increases in service can be offered. In addition, a spill of any magnitude would require the complete discontinuation of service until the area was decontaminated. A larger area would allow the continuance of reduced, but essential service by working around the contamination.

(3) Equipment

The majority of the radioactive type processing equipment is on loan from one of the Institutes. Essentially, no counting equipment is available for immediate use and often has not been available, particularly for compounds tagged with C^{14}. Service would be curtailed seriously if this loaned equipment was recalled.

Following is an example of the type of contribution toward the safety of patient care which the Radiopharmaceutical Service is making in the use of radioactive drugs at the CC. In May, 1961, a clinician submitted two sealed glass ampules each containing 25 uc hydrocortisone-4-C-14 dissolved in an unknown solvent system "for sterilization prior to intravenous use." The clinician professed no knowledge of the solvent present, and when the Chief, RPS, contacted the supplier of the material, he was informed the solvent consisted of 5% methanol and 95% benzene. This information did not appear on the manufacturer's label or in his catalogue. The mistaken injection of such material into a human by a less diligent clinician than the one who submitted the material could easily have happened were it not for this Service. A subsequent shipment from the same supplier, and for the same clinician, contained 50% methanol and benzene as a solvent. There are no Federal regulations covering those types of products, and only diligent care and searching out of information by the Department will provide the clinicians with safe products.

In addition, many products have been prepared and processed for the clinical area which are not available from other sources.

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Following is a summary of the major problems and recommendations discussed in more detail in each section of this report:

(1) Space is the most pressing problem in several areas. The Central Sterile Supply area cannot increase service, particularly in the Surgery Packaging Area. The Pharmaceutical Development Service is in desperate need of an area in which to process extremely toxic materials. Space is just as necessary to establish a product quality control area so as to check newly developed products and protect patients from a deteriorated or unstable drug. Industry is required by law to provide such protection and is expected to do so by all clinicians. Yet, the Pharmacy Department does not provide this minimum. The C.C.N.S.C. has experienced some undesirable results with new products which reduced in potency even after initial industry test proved satisfactory. This proved to all that new

products need to be retested for stability on a scheduled basis.

The Radiopharmaceutical Service has not been able to deliver all products necessary due to inability to carry on several projects at once. Improvement or increase in service has been halted until additional suitable space is made available.

(2) Obtaining properly trained professional personnel and retaining them is a problem which seems to become more insurmountable each year.

PHARMACY DEPARTMENT STATISTICAL DATA

	1958 (Fiscal)	1959 (Fiscal)	1960 (Fiscal)	1960 (Calendar)	[illegible] (Fiscal)	1961* (Calendar)
Total number of units issued	2,872,022	3,110,519	3,617,102	3,768,950	3,[illegible]327	4,097,65[illegible]
Pharmacy Service						
Prescriptions	17,453	23,775	24,907	24,989	[illegible]6,570	29,38[illegible]
Other Items	206,440	218,484	244,010	249,226	[illegible]598	262,[illegible]14
Prepackaged Items	----	----	---	----	[illegible],132	71,[illegible]07
Total	223,893	242,259	268,917	274,215	[illegible],300	362,[illegible]01
Central Sterile Supply Service						
Units Issued	2,638,179	2,848,488	3,320,222	3,457,763	3,602,498	3,691,85[illegible]
Pharmaceutical Development Service						
Units [illegible] and Issued	9,366	18,587	21,912	34,983	[illegible]6,819	41,427
Requests [illegible]ssed	992	784	923	1,010	1,423	1,93[illegible]
Investigational Drugs Registered	---	488	339	302	298	321
Radiopharmaceutical Service						
Units [illegible]ped and Issued	584	1,185	2,051	1,989	1,710	1,47[illegible]
Requests Processed	107	135	303	357	311	330
Pharmacy Officer of the Day						
Number of Requests for Service	---	---	---	910	1,240	1,134

*December, 1961 totals are estimated.

Publications, speeches given, or significant accomplishments by Pharmacy Department personnel include:

Milton W. Skolaut

Contributing editor to the AMERICAN JOURNAL OF HOSPITAL PHARMACY, section entitled "Pharmacy -- Central Sterile Supply Services":
"Organization and Supervision", Vol. 18; March 1961,
"Ethylene Oxide Sterilization", Vol. 18; July, 1961,
"Cataloging a Problem", Vol. 18; May, 1961.

Chairman Committee on Minimum Standards and member Executive Committee, American Society of Hospital Pharmacy.

Ernest S. Lentini

"Ethylene Oxide Gas in Sterilization", AMERICAN JOURNAL OF HOSPITAL PHARMACY, Vol. 18, November, 1961.

Carl H. Brown

Chairman elect, Section on Military Pharmacy, American Pharmaceutical Association.

William H. Briner

"The Formulation of Radioactive Krypton^{85} for Intravenous Use", AMERICAN JOURNAL OF HOSPITAL PHARMACY, Vol. 2:94 (April, 1961).

"A Note on the Formulation of Iodine-131 Labelled Polyvinylpyrrolidone for Intravenous Administration", JOURNAL OF NUCLEAR MEDICINE, Vol. 2:94 (April, 1961)

Principles in the Production and Formulation of I-131 Labeled Polyvinylpyrrolidone and Cr-51 Labeled Serum Albumin for Parenteral Use", to be published as part of the Proceedings of the Symposium on the Gastrointestinal Tract and Plasma Proteins in Health and Disease, held at St. Antoine Hospital, Paris, France, by the Munsgaard Press, Copenhagen, Denmark, in press.

Donald E. Hill

"Medications for Nursing Stations When the Pharmacy is Closed", AMERICAN JOURNAL OF HOSPITAL PHARMACY, Vol. 18, No. 10 (October, 1961)*

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*Prepared while officer was stationed at the USPHS Hospital, Baltimore, Md.

Calendar Year 1961

PUBLIC HEALTH SERVICE NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

MEDICAL RECORD DEPARTMENT CC-46
Serial No.

OBJECTIVES:

The Medical Record Department is delegated the major responsibility of insuring the completeness, accuracy, safekeeping and availability of medical records by maintaining the following internal controls: (1) Continual appraisal of the medical records of patients registered at the Clinical Center, in order to maintain the standards established by the Clinical Center and accrediting agencies; (2) Maintenance of required indexes; namely, the analysis of discharged patients and the diseases and operations index (based on Standard Nomenclature of Diseases and Operations), with a view toward providing adequate basic data to physicians participating in Medical Research; (3) Maintenance, compilation and distribution of statistical data, concerning patient care, for utilization by administrative, clinical and research directors; (4) Maintenance of a systematic arrangement of medical records to insure their immediate accessibility for purposes of patient care service and medical research; (5) Maintenance of a system whereby the quantity and quality of dictated medical record reports are controlled, (6) Maintenance of an adequate control system with regard to the release of medical reports, medical information and medical records to authorized recipients; (7) Maintenance of a perpetual patient's index (Soundex) and patient registry.

PROGRESS MADE:

During the year 1961 there were 3,863 medical records received for qualitative and quantitative analyses and posted to the discharge analysis. Also during the year, 58 research projects, using groups of medical records, were accomplished, and 28 special statistical studies were completed.

To execute basic controls properly, standard operative procedures were supported and new ones developed as follows:

Education and Training:-

Lectures were presented to Medical Record Department personnel by Dr. Kirkland Brace whose subject was Radiation Therapy, and by Dr. Edward Laskowski whose subject was Neurological Operative Procedures.

Arrangements were made to have key personnel attend seminars and Institutes relating to organization and management, automatic data processing application and technique of new office equipment.

Medical Record Department

Orientation of new employees from this Department and other Clinical Center Departments was accomplished. Lecture tours continue to be given to Public Health Service medical record librarian students and other visitors to the Clinical Center.

Personnel:-

Two qualified medical record librarians were added to the staff in 1961 and all clerk-typist vacancies filled.

It is felt that the relatively high turnover of personnel in the Files Section was due to the offer of higher grades elsewhere.

Procedures Involving Institutes:-

Established a new NCI procedure for the purpose of including information with regard to the name of responsible senior attending physician for all chemotherapy patients discharged.

A new form titled Research Summary Report - Circulating Tumor Cell Study is currently being designed for use by the NCI Surgery Branch as a Research Record.

Procedures Involving Medical Record Department:-

Action was taken to eliminate the multilith production backlog. An employee, who is an experienced operator and is well versed in the operation of the equipment, was made Supervisor of the multilith operators. There has been no turnover of multilith operators in 1961.

Action was completed to install adequate corrective measures in the multilith room which resulted in the elimination of noise and fumes.

In May, a pilot study was completed, in cooperation with the Institutes, utilizing new models of dictating equipment; namely, IBM, Gray Audograph and Dictaphone. However, the Gray Audograph equipment will continue to be used by this department since it continues to produce satisfactory results.

In September, the Transcribing Section conducted a pilot study using an IBM Selectric typewriter. It was decided to delay evaluation of the IBM typewriter until a special ribbon could be secured; the existing ribbon produced an unsatisfactory master. The Selectric typewriter was tried by other sections and produced good results; it was felt that this typewriter was far superior to the equipment currently being used.

In March, a new form was introduced; that is, the Notice of Pickup of Medical Records. Each time a medical record is removed from an area or party to whom the record has been charged, this form is completed and serves as a notification of the removal of the record, the reason for removal and

by whom. The record is returned to the party only if he signs and returns the notice to the Medical Record Department.

The Daily Cumulative Census and Discharge Analysis were revised and approved. The latter form was introduced to conform with new NCI and NHI policies and reflects newly created branches within these Institutes.

Statistical cumulative work tables have been revised to include definitions and related pertinent data in order to effect standardization in the collection of statistical information.

During May and June, procedures were established, in cooperation with the Admissions Unit; that is, advance provision of medical records for weekday as well as weekend scheduled readmissions.

In June, the filing of Special Reports in Section II of the record folder was established. It is hoped that with this new filing arrangement, people will be discouraged from disarranging and removing reports from the basic record.

In October, an employee of the Medical Record Department was located in the Admissions area to correlate medical record administrative activities with the Admission and Follow-Up Unit.

A list of record deficiencies through August 1961 was prepared by Institute and Physician. The last covering memorandum, prepared for the signature of Assistant Director, CC, resulted in extensive clearance of medical record deficiencies.

Information regarding physicians participating in patient care was made current on all control lists.

In December, job procedures for all phases of duties in the Medical Record Files Section were completed. Also a prototype medical record was prepared for reference and training of file clerks.

New preprinted medical record folders were ordered and put into operation. These folders now provide space for entering the patient's name.

A unit record for each patient, relating to all medicolegal action taken by this department, was established for inclusion in the medical record. The unit record provides complete information regarding material released and material requested.

PRODUCTION:-

There follows a summarization of the work production as related to the respective sections.

Medical Record Department

Medicolegal Unit received, screened, completed or prepared for mailing purposes, 6,020 pieces of material such as medical reports, letters, insurance forms and other related material.

Medical Record Files Section: A total of 30,580 masters were reproduced during the Calendar Year consisting of 251 actual working days and 18.6 additional days or 150 hours of overtime. A total of 29,575 medical records were pulled and delivered for purposes of research study or review for completion; 28,560 records were pulled and delivered for inpatient admissions and outpatient visits.

A total of 5,704 pages were duplicated by verifaxing; these pages include medical reports, correspondence, insurance forms and other related material for Clinical Center departments and Institutes.

Medical Record Transcribing Unit:

	1960	1961	
Discs Received	7,783	8,728	12% Increase
Discs Transcribed	7,710	8,750	13% Increase
Masters and Reports, pages transcribed	28,220	30,202	7% Increase
Remaining Work	416	249	40% Decrease

The remaining work includes discs to be transcribed, reports to be reviewed, signed or duplicated. Of the reports sent to physicians for signature and not returned, the earliest date of receipt of disc is 30 November 1961; reports not yet transcribed, the earliest date of receipt of disc is 26 December 1961.

The daily average number of transcribers was 21; daily average number of pages transcribed was 120. The work was completed during 251 actual work days and 28.3 additional days or 227 overtime hours.

The diagnostic index has been completed for discharges from July 1953 through June 1959. The following table reveals coding and posting accomplished during calendar year 1961:

	CY 1958	CY 1959	CY 1960	CY 1961
Number of Discharges	3275	3485	3658	3863
Coded & Posted CY 1960	2450	2127	429	0
Remaining as of 12-31-60	825	1358	3229	0
Coded & Posted CY 1961	825	932	810	2438
Remaining as of 12-31-61	0	426	2419	1425

Medical Record Department

MAJOR PROBLEMS:

As of 31 December 1961, the Personnel Section has failed to take the necessary action with regard to: (1) the fourteen (14) revised position descriptions resulting from the annual audit of positions which was accomplished in April and (2) the standards developed for clerk-typist positions which were submitted in February upon request of the Personnel Section.

The Clinical Center registered 3,971 new patients during Fiscal Year 1961. One file shelf will hold an average of 46.4 charts, which means that 78 more shelves (or 179.4 linear feet) were utilized to file the additional medical records. This is not taking into account the expansion of medical records for patients previously registered who were readmitted during Fiscal Year 1961. Each terminal section (except one section) has two shelves which are presently used for storing and filing material other than patients' records. Additional storage space must be provided for filing and storing this material to allow for expansion in Calendar Years 1962 and 1963, after which time additional filing shelves and area must be provided.

Because thermostatic control continues to be a problem, on 22 August 1961, a request was made for a survey in order to correct atmospheric working conditions.

A representative from the Multilith Corporation has not yet completed his study with regard to the use of masters for the Admission and Discharge Report as well as the medical reports; masters in current use produce an illegible report. Concurrently, this department has requisitioned Plasti-Plate masters from the Remington Rand Corporation to be used on a trial basis

PROPOSED FUTURE OBJECTIVES:

Preparation of job procedure manuals for the three remaining medical record sections.

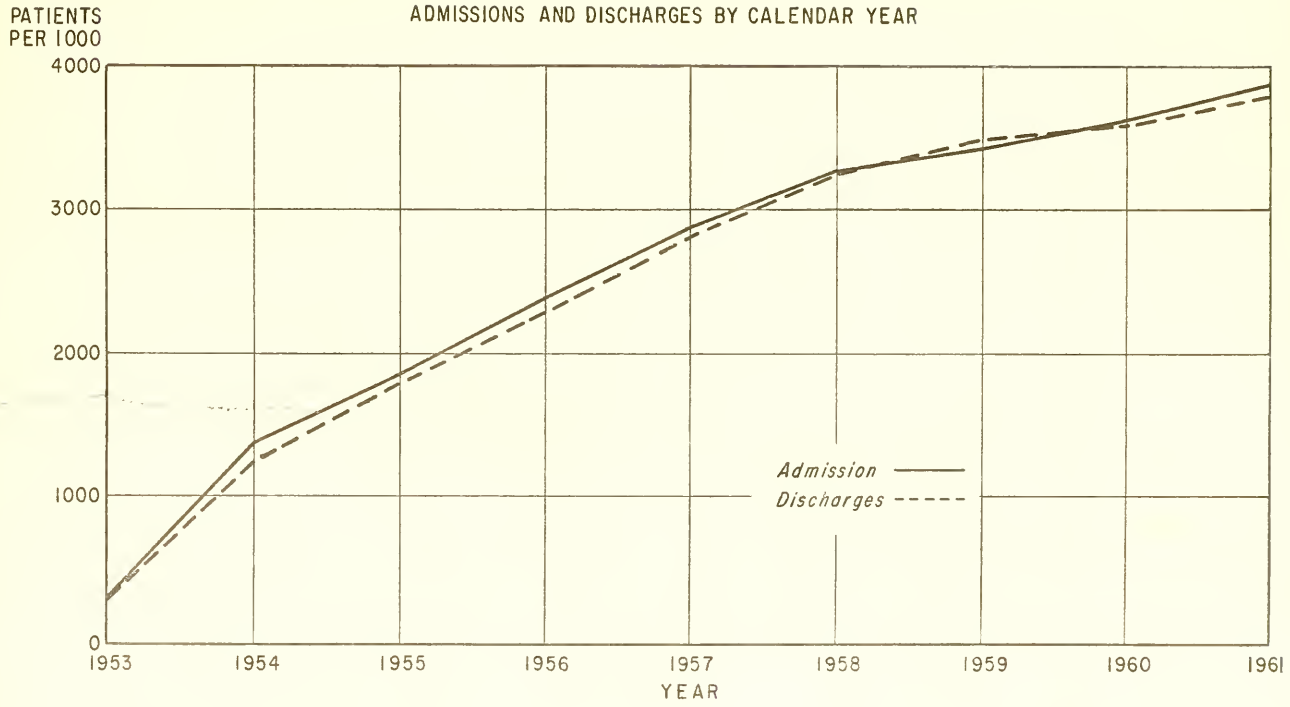
Revision and up-dating of Medical Record Department Handbook which is distributed to NIH physicians, Clinical Center personnel and Visitors.

Correlation and study of techniques employed in the Preadmissions Unit, Admissions Unit and Medical Record Department for the purpose of possible application of automatic data processing equipment.

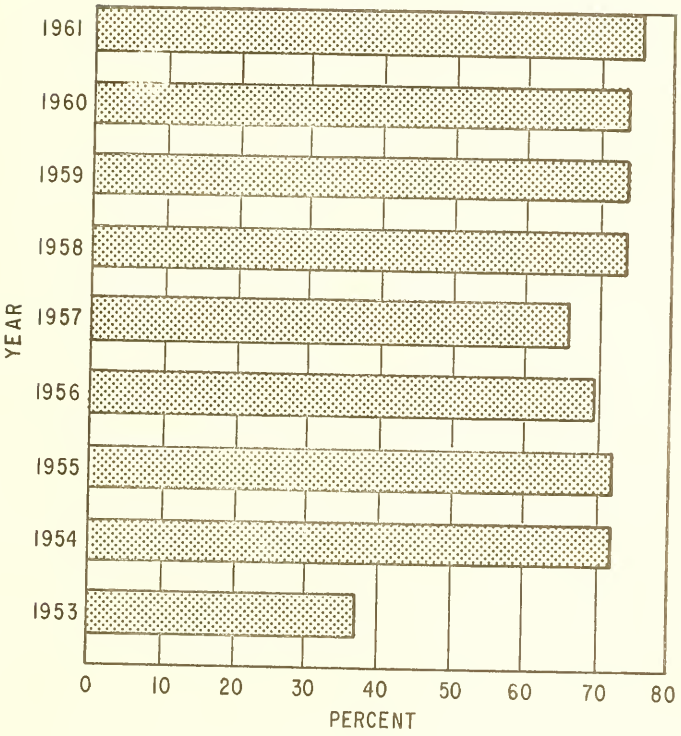
Medical Record Department

STATISTICS - Fiscal Year 1961

I. Registration			
A. Patients			6,006
Inpatients		3,758	
First Registration	1,721		
Readmission	2,037		
Outpatient (First Registration)		2,190	
Walk-In		39	
Emergency		19	
B. Carded for Record Only			2
C. Employee Registration			1,990
II. Patient Care Statistics			
Total Number of Admissions			3,758
Total Number of Discharges (includes 208 deaths)			3,769
Total Patient Days			141,214
Available Bed Days			188,340
Average Daily Census			387
Average Length of Stay			37
Percentage of Occupancy			75
Total Number of Deaths			208
Total Number of Autopsies			194
Total Number of Patients admitted from July 6, 1953 to June 30, 1961			21,408
Percentage of patients admitted during FY 1961 from Maryland, Virginia and the District of Columbia			46

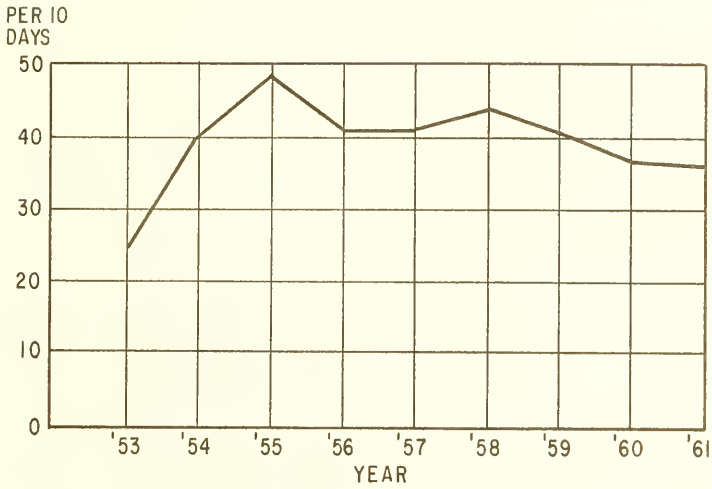

ADMISSIONS AND DISCHARGES BY CALENDAR YEAR
PATIENTS PER 1000
4000
3000
2000
1000
0
1953
1954
1955
1956
1957
1958
1959
1960
1961
YEAR
Admission
Discharges

PERCENTAGE OF BED OCCUPANCY BY CALENDAR YEAR



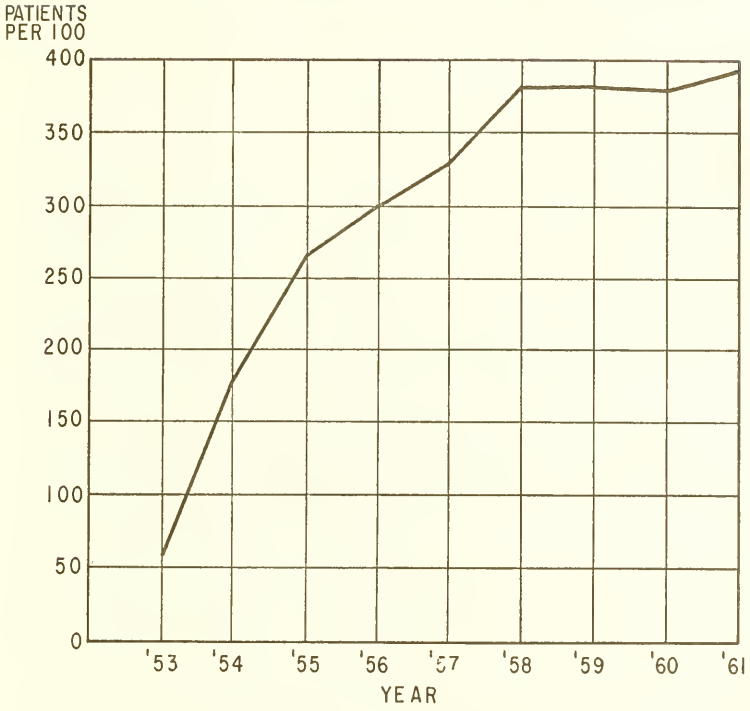
YEAR	PERCENT
1953	37
1954	72
1955	72
1956	69
1957	66
1958	74
1959	74
1960	74
1961	76

THE AVERAGE LENGTH OF STAY PER DISCHARGE BY CALENDAR YEAR



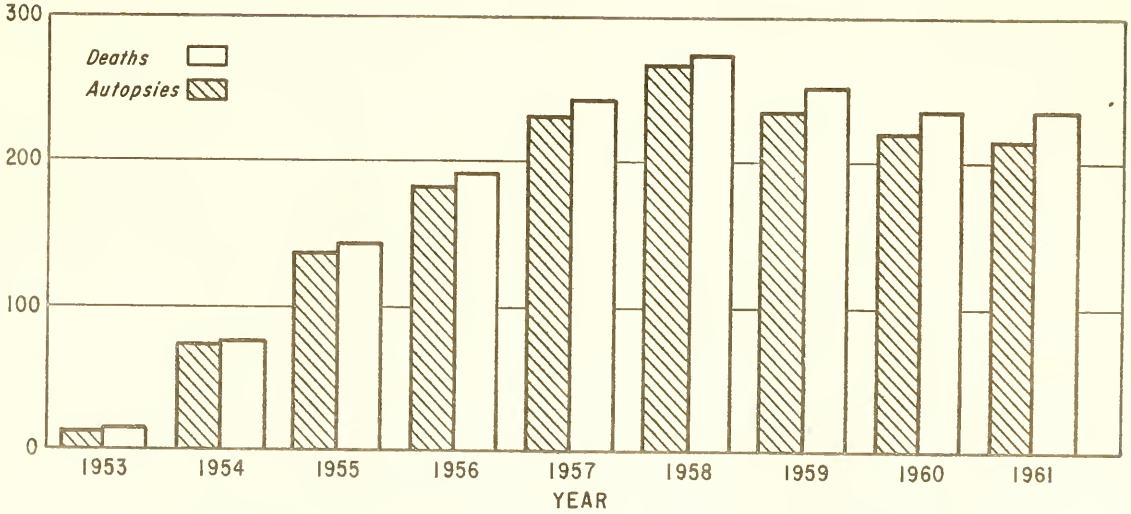
YEAR	AVERAGE LENGTH OF STAY PER DISCHARGE (days)
1953	24
1954	40
1955	48
1956	41
1957	41
1958	44
1959	41
1960	37
1961	36

DAILY AVERAGE NUMBER OF PATIENTS BY CALENDAR YEAR



YEAR	AVERAGE NUMBER OF PATIENTS
1953	59
1954	176
1955	264
1956	300
1957	329
1958	384
1959	384
1960	380
1961	394

THE NUMBER OF DEATHS AND AUTOPSIES OF
CLINICAL CENTER INPATIENTS BY CALENDAR YEAR



YEAR	NUMBER OF DEATHS	AUTOPSIES
1953	16	15
1954	77	73
1955	147	139
1956	194	187
1957	245	233

YEAR	NUMBER OF DEATHS	AUTOPSIES
1958	278	269
1959	255	239
1960	237	222
1961	236	218

Calendar Year 1961

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

NURSING DEPARTMENT

CC-51
Serial No.

A. Program Goals

The major goals of the Nursing Department remain the same: (a) provision of the best possible nursing care to patients with the staff available; (b) provision of assistance to the clinical investigators; (c) orientation, training, and supervision of personnel so that they may become more proficient in carrying out (a) and (b); and (d) nursing research directed toward improving nursing administration and nursing practice.

B. Progress Made

1. For the most part, we have been able to meet the daily demands for nursing services fairly adequately. To do so has required the most careful planning and evaluation of needs and cooperative relationships between the nursing services and the Office of the Chief.

2. A number of changes have been made in our training programs which have made them more effective in preparing our personnel to carry out their jobs efficiently and with more understanding of the elements in their jobs.

3. The activities study was completed and is noted elsewhere in this report. The implementation of the findings will take some time, and we are barely underway.

   A limited pilot study of the use of an administrative assistant to the head nurse has been done on the Heart Surgical Nursing Unit, as well as on both of the ninth floor nursing units. We have made no decision, as yet, as to whether enough of the head nurse's time can be saved for other activities to justify the addition of an administrative assistant to her staff.

4. In March 1961, the supervision during the evening and night tours of duty was centralized in the Office of the Chief. Adjustment to this change took several months. Many of the projected advantages seem to have been proved, and there is a distinct improvement in the supervisory program during these tours of duty.

In addition, the supervisory staff has been reduced by three to four people, and the supervisors have expressed their satisfaction with this change.

5. The Employee Health Service has provided nursing coverage from 8 a.m. to 4:30 p.m. on Saturdays, Sundays, and holidays since February 4, 1961. This has relieved the Nursing Department considerably.

C. Developments and Trends

1. The recruitment of personnel, particularly professional nurses, remains a perennial problem. The need for professional nurses seems to be increasing because of the many and diverse research projects and the increasingly complex and time-consuming procedures which are being done as part of the research. At the present time there is need for recruiting nurses in the higher grades to replace people who will be leaving the staff in the next year or two. Competition is very great for competent and well prepared people, and grades and salaries are not sufficiently high to compete with the universities and best medical centers throughout the country.

   For the first time since the Clinical Center was opened, we are having difficulty filling positions for male nursing assistants. The caliber of applicants is mediocre, and there is a dearth of applicants. Many of our well trained male nursing assistants have transferred to other organizational areas at NIH either because of higher grades or regular hours (8:30 a.m. to 5 p.m., Monday through Friday).

2. The number of hours of continuous nursing care during fiscal year 1961 was 54,311 1/2 compared with 62,604 3/4 hours for fiscal year 1960. The reduction was most pronounced on the Heart Nursing Service --approximately 9,000 hours less than for last year.

3. The number of part-time nurses was reduced during the year, thus 37,499 hours were provided by this group. During fiscal year 1960, 44,317 1/4 hours were provided by part-time nurses.

4. The daily average pediatric census was 70.8 during the year, whereas that for the fiscal year 1960 was 61.2. The increase was reflected chiefly in the number of children under 6 years of age --approximately 48 percent of the total census.

5. Because Federal funds for metabolic research are being awarded to medical centers throughout the country, we have had an increasing number of requests for training and observations in our metabolic research units --for periods of 1 to 4 weeks. Although we are pleased that the clinical investigators want the nurses in charge of their units to come here, and we are glad to share

our techniques and experiences with them, we find it difficult at times to carry through programs for them. The nurses in charge of our metabolic nursing units on all the services have almost more than they can do to carry the work load involved in their own jobs. We are trying to work out some plan to relieve them of assuming so much responsibility for visitors.

D. Major Problems

Most of the problems reported last year are still with us, and we have tried to learn how to function around or with them, as there seems to be little we can do about them. Some have been referred to, indirectly, throughout this report, but a few are worthwhile listing because we are still hopeful a solution can be worked out.

1. Children are not segregated except on the Cancer Nursing Service. This involves much movement of patients and furniture; maintenance of a variety of linen and clothing items for both adults and children in space which is totally inadequate for efficient and easy storage; much searching for cribs, youth beds, and bassinets when children are to be admitted because there is no central storage for these items; and an accumulation of drugs in small dosages for children, along with other drug items for adults in space which is limited for storage of drugs. In addition, the physical facilities on the nursing units are geared toward the care of adult patients, so play and recreation areas for children are limited.

2. Except on the Psychiatric Nursing Service, there is limited to almost no preplanning with the nursing staff before new projects are initiated or new procedures are started. Frequently, as a result, much confusion ensues, instructions are conflicting, and misunderstandings arise --all of which affect the relationships between the medical and nursing personnel involved. Improved communication and cooperative planning would solve this problem and improve the participation of both groups.

3. Lack of office, conference, and storage space is still a problem. The most acute of all is the lack of storage space for essential equipment used in patient care. Beds are in the halls where people sit on them, where they become dusty, and where sometimes they are broken. A tour of the building is often necessary to locate cribs, other items of furniture, and needed but less often used equipment because there is no central storage area large enough to accommodate these essential items. Occasionally, it is necessary to declare some items surplus because there is no place to store them.

4. There is a lack of waiting space for patients coming to clinics which are held in the south wing of the Admissions and Followup Department. Folding chairs must be placed in the corridor to accommodate the overflow. This corridor is used as a thoroughfare for laundry trucks, and leads into the new surgical pavillion and thus is undesirable and even hazardous to patients who are waiting to be seen in the clinics.

5. Problems still continue to arise in relation to the clinic clerk in the eye clinic. She is not an employee of the Clinical Center and thus feels no need to carry out the policies and procedures under which the other clerks work in the Admissions and Followup Service.

6. The loss of the utility room on 2B (training area), as well as the loss of the inhalation therapy demonstration room, has posed a very real problem because arrangements must be made on the nursing units for teaching personnel such procedures as oxygen therapy, sterilization techniques, and the like. Much movement of equipment is involved, as well as special arrangements with the Housekeeping Department and Mr. Kuster, who must assist in transporting equipment. Unfortunately, the same nursing unit cannot always be used because of program and patient care needs on the units.

7. The turnover in our professional nursing staff continues to be a very real problem and one for which there seems to be no solution. Staff nurses seem to move from job-to-job frequently, not only here but all over the country. We are unable to compete salary-wise with the large medical centers and the Veterans' Administration, and have lost a number of nurses this past year because they could get a higher salary elsewhere. That most of our patients are chronically ill and remain a long time is also a factor in the turnover of professional nurses.

E. Accomplishments

1. Publications

(a) Beauregard, M.S.W., Wadeson, Ralph W., Jr., M.D., and Walsh, Louise, R.N. "Recording Symptom and Behavior Observations on a Metabolic Unit." Journal of Chronic Diseases, Vol. 14 (6): 609-629. Dec. 1961.

(b) Benson, Margaret A., R.N., and McCalla, June, R.N., "Your Child is Coming to the Clinical Center." U. S. Department of Health, Education, and Welfare publication, October 1961.

(c) Crawley, Mildred, R.S., M.A. "Care of the Patient With Myocardial Infarction." American Journal of Nursing, Vol. 61 (2): 68-70. Feb. 1961.

(d) Edwards, Elizabeth, B.S., M.S. "Mycosis Fungoides." American Journal of Nursing, Vol. 61 (2): 61-63. Feb. 1961.

(e) Fitzwater, Janet, B.S., M.S. "Bacteriological Effect of Ultraviolet Light on a Surgical Instrument Table." Public Health Reports, Vol. 76 (2): 97-104, Feb. 1961. Modern Medicine, (abstract), p. 97, June 1961.

(f) Fitzwater, Janet, B.S., M.S. "New Equipment for the Operating Room." The American Journal of Nursing, Vol. 61 (8): 54-55. Aug. 1961.

(g) Lech, Marie M., B.S., M.A. "Equipment for Collecting Specimens." American Journal of Nursing, Vol. 61 (3): 91, March 1961.

(h) Wilcox, Jane, B.A., D.Sc. "Observer Factors in the Measurement of Blood Pressure." Nursing Research, Vol. 10 (1): 4-18. Winter issue 1961.

(i) 3 East, Psychiatric Nursing Service. Case 21. "Successful Reassessment of a Nursing Plan." Toward Therapeutic Care, a Guide for Those Who Work With the Mentally Ill, 1961: 84. Published by Group for the Advancement of Psychiatry, 104 pp. 1961.

F. Plans for 1962

1. To continue efforts to improve in the various areas of our program goals.

2. To extend nursing research into the area of direct nursing care to patients through the use of television as an observational tool; hopefully, to study procedures relative to isolation techniques in order to simplify them, as well as to improve the methods of protecting patients against infections.

3. To plan and organize training and observations on the metabolic units in such a way as to utilize the time of both visitors and our own staff more effectively. As an outcome of the many new research units throughout the country, as well as the construction of small clinical centers and the concomitant requests for assistance and consultation, we feel that we must be better prepared and ready to provide this than we have been this past year.

NUMBER ACCESSIONS TO THE NURSING DEPARTMENT
BY POSITION AND GRADE EACH MONTH
FISCAL YEAR 1961

Month	GS-11 and above	Head Nurse GS-9	Staff Nurse GS-7	Staff Nurse GS-5 and -6	Clerical GS-3 and -4	Practical Nurse GS-3	Nursing Ass't GS-2	Total
	No.	No.	No.	No.	No.	No.	No.	No.
1960								
July	0	0	2	8	5	0	0	15
August	1	1	1	4	6	3	0	16
September	0	1	2	30	2	2	5	42
October	0	0	1	12	3	3	0	19
November	0	0	0	7	1	1	0	9
December	0	0	1	3	0	1	3	8
1961								
January	0	0	0	6	1	2	5	14
February	1	0	0	9	2	4	0	16
March	0	0	1	5	0	1	6	13
April	0	0	0	3	2	2	0	7
May	0	0	0	6	1	3	7	17
June	0	0	0	8	3	3	9	23
Total	2	2	8	101	26	25	35	199

NUMBER OF SEPARATIONS FROM THE NURSING DEPARTMENT
BY POSITION AND GRADE EACH MONTH
FISCAL YEAR 1961

Month	GS-11 and above	Head Nurse GS-9	Staff Nurse GS-7	Staff Nurse GS-5 and -6	Clerical GS-3 and -4	Practical Nurse GS-3 and -4	Nursing Ass't GS-2 and -3	Total
	No.	No.	No.	No.	No.	No.	No.	No.
1960								
July	0	0	2	3	5	0	1	11
August	0	1	0	8	3	1	3	16
September	0	0	3	10	2	3	6	24
October	1	0	0	4	0	1	1	7
November	0	1	0	4	1	0	0	6
December	0	0	0	3	2	2	3	10
1961								
January	0	1	1	6	0	4	3	15
February	0	0	3	1	1	1	6	12
March	0	0	2	10	1	1	4	18
April	1	0	2	6	4	0	4	17
May	0	0	1	10	2	2	3	18
June	0	0	4	9	2	2	1	18
Total	2	3	18	74	23	17	35	172

NUMBER OF HOURS OF CONTINUOUS NURSING CARE
FISCAL YEAR 1961

Month	Nursing Service						
	Allergy and Infectious Diseases	Arthritis and Metabolic Diseases	Cancer	Heart	Neurology and Blindness	Psychiatric	Total
	Hours	Hours	Hours	Hours	Hours	Hours	Hours
1960							
July	645	231	1,064	1,846	950	30 1/2	4,766 1/2
Aug.	334	302 1/2	1,262 1/2	1,003 1/2	1,429	100	4,431 1/2
Sept.	493	47	1,067	1,210	1,766	35 1/2	4,618 1/2
Oct.	225	346	1,343	2,932 3/4	728	250	5,824 3/4
Nov.	357	54	1,292	3,052	391	132	5,278
Dec.	69	214 1/2	1,810	2,722 1/2	368	421 1/4	5,605 1/4
1961							
Jan.	114	189	1,399	1,793	1,047	48	4,590
Feb.	639	45 3/4	1,171 1/2	2,087 1/2	168	67	4,178 3/4
March	539	205	731 1/2	1,923 1/2	548	99 1/4	4,046 1/4
April	778 1/2	96	555 1/2	1,361 1/4	460	57 1/2	3,308 3/4
May	60	248	1,060 1/2	1,289 1/2	619	113	3,390
June	715 1/2	109 1/2	867	1,697 3/4	824	59 1/2	4,273 1/4
Total	4,969	2,088 1/4	13,623 1/2	22,919 1/4	9,298	1,413 1/2	54,311 1/2 1/

1/ Equivalent to: 6,788.9 8-hour days
1,357.8 20-hour weeks
31.0 man years

NUMBER HOURS WORKED BY PART-TIME PROFESSIONAL
NURSING STAFF (W.A.E.) BY SERVICE
DURING FISCAL YEAR 1961

Month	Nursing Service							
	Admissions and Followup	Allergy and Infectious Diseases	Arthritis and Metabolic Diseases	Cancer	Heart	Neurology and Blindness	Psychiatric	Total
	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours
1960								
July	5	50	658	1,281 1/2	829 1/2	452 1/2	152	3,428 1/2
Aug.	0	12	683 1/2	1,681 1/2	538	327 1/2	256	3,498 1/2
Sept.	0	87	656	1,431	704 1/2	209	261	3,348 1/2
Oct.	0	12 3/4	770 1/4	1,570	1,149	57	268	3,827
Nov.	72	197	1,167	1,438	1,004	47	281	4,206
Dec.	136	96	1,129 1/2	1,381	817	16	264	3,839 1/2
1961								
Jan.	118	66	1,091	1,399	746	24	285	3,729
Feb.	112	100	1,124	1,183	628	0	215	3,362
Mar.	148	72	766	868	622	0	128	2,604
Apr.	127	112	416	496	456	56	48	1,711
May	144	64	488	805	264	24	96	1,885
June	112	80	689	719	372	8	80	2,060
Total	974	948 3/4	9,638 1/4	14,253	8,130	1,221	2,334	37,499 1/

1/ Equivalent to: 4,687.4 8-hour days
937.5 40-hour weeks
21.4 Man years

NUMBER OF HOURS OF OVERTIME DURING
FISCAL YEAR 1961

Month	Nursing Service								
	Admissions and Follow-up	Allergy and Infectious Diseases	Arthritis and Metabolic diseases	Cancer	Heart	Neurology and Blindness	Psychiatric	Surgery	Total
	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours
1960									
July	20	41 1/2	177	107 3/4	55	8	48	94	551 1/4
Aug.	24	0	171 1/4	157 1/4	10 3/4	13	23 1/2	55	454 3/4
Sept.	38 1/4	12	102 1/2	115	33	17 1/2	48 1/2	81 1/2	448 1/4
Oct.	14 3/4	14 1/2	133 3/4	122 3/4	20	8	71 1/2	51 1/2	436 3/4
Nov.	17	8	107 3/4	136 1/2	11 1/4	0	59	31 1/2	371
Dec.	24	38 3/4	115	98	51 3/4	0	33 1/2	52 1/2	413 1/2
1961									
Jan.	46 1/4	8 3/4	122 1/4	148	39 1/2	0	54 1/2	32	451 1/4
Feb.	23	41	119	75	41 1/2	0	47	67 1/2	414
March	0	0	62 1/2	7 3/4	1 1/2	0	8	65 1/2	145 1/4
April	18	3	36 1/4	0	45 3/4	0	0	22 1/2	125 1/2
May	20 1/2	2 1/2	68 1/2	0	0	0	15 1/2	27	134
June	20 1/2	31	68 1/4	72	0	0	130 1/2	56 3/4	379
Total	266 1/4	201	1,284	1,040	310	46 1/2	539 1/2	637 1/4	4,324 1/2 [1/]

Equivalent to: 540.5 8-hour days
108.1 40-hour weeks
2.5 Man years

NUMBER OF HOURS OF LEAVE TAKEN
IN NURSING DEPARTMENT
FISCAL YEAR 1961

Daily average personnel and type leave	Profes-sional staff	Non-profes-sional staff	Clerical staff	Total staff
Daily average number personnel----------	317.7	250	44	611.7
Annual leave				
Total hours taken----	38,028.0	31,505.00	5,229.00	74,762.0
Average hours per person----------	119.7	126.00	118.80	122.2
Average working days per person---------	14.9	15.70	14.80	15.3
Sick leave				
Total hours taken----	23,179.0	20,126.00	3,390.00	46,695.0
Average hours per person----------	76.1	80.50	77.04	76.2
Average working days per person---------	9.5	10.08	9.60	9.5
Other leave				
Total hours taken----	11,035.5	11,234.00	2,197.00	24,466.5
Average hours per person----------	34.7	44.90	49.90	40.0
Average working days per person---------	4.3	5.60	6.30	5.0
Total hours of all leave	72,242.5	62,865.00	10,816.00	145,923.5
Average hours per person----------	227.4	251.40	245.80	238.6
Average working days per person---------	28.4	31.40	30.70	29.8

RECORD OF NURSES FOR WHOM SOME OBSERVATIONS AND TRAINING IN RESEARCH NURSING WERE PROVIDED

Requesting institution	Title of visitor	Length of visit	Observations planned and provided
University of Arkansas Medical Center, Little Rock, Arkansas----------	Head nurse	2 weeks	Metabolic units on Arthritis and Metabolic Diseases, Heart, and Cancer Services.
Division of Medicine, University of Tennessee, Memphis, Tennessee--------	Head Nurse	3 days	Metabolic unit, Arthritis and Metabolic Diseases Service.
Roswell Park Memorial Institute, Buffalo, New York---	Head Nurse	2 weeks	Metabolic Units on Arthritis and Metabolic Diseases, Heart, and Cancer Services.
Hospital of Rockefeller Institute, New York, New York----------	Supervisor	2 weeks	Metabolic units and Cancer units.
Nursing Department, Johns Hopkins Hospital, Baltimore, Maryland-------	Head Nurse	1 week	Metabolic unit, Arthritis and Metabolic Diseases Service.
Department of Medicine, University of North Carolina, Chapel Hill, North Carolina	Head Nurse	1 week	Metabolic unit, Arthritis and Metabolic Diseases Service.
University Hospital and Hillman Clinic, University of Alabama Medical Center, Birmingham, Alabama-------	Supervisor	1 week	Metabolic units, Arthritis and Metabolic Diseases, Heart, and Cancer Services.
Nursing Department, University of California Medical Center, San Francisco, California-----	Instructor	1 week	Cancer Nursing Service.
City of Memphis Hospitals, Memphis, Tennessee-------	Director of Nursing	1 week	Metabolic units on Arthritis and Metabolic Diseases, Heart, and Cancer Services.
Georgetown University Hospital, Washington, D. C.----	Staff nurse	2 weeks	Cardiac Catheterization Laboratory.
Childrens Hospital, Boston, Massachusetts----------	Instructor	1 day	Heart Surgical Post-operative care

(continued)

RECORD OF NURSES FOR WHOM SOME OBSERVATIONS AND TRAINING IN RESEARCH NURSING WERE PROVIDED
(continued)

Requesting institution	Title of visitor	Length of visit	Observations planned and provided
Metabolic Research Unit, University of Pennsylvania Hospital, Philadelphia, Pennsylvania----------	Head Nurse	1 week	Metabolic Units on Cancer and Arthritis and Metabolic Diseases Services.
Veterans Administration Hospital, Iowa City, Iowa----	Head Nurse	2 weeks	Metabolic units on Arthritis and Metabolic Diseases, Heart, and Cancer, and Radiation Unit on Cancer Service.
New York Hospital, Cornell Medical Center, New York, New York----------	Supervisor and Department Head	2 days	Metabolic Research Techniques. Administration of research units.
Los Angeles County General Hospital, Los Angeles, California----------	Research assistant	2 days	Cancer Service. Conference with Dr. Jane Wilcox.
University of Washington Hospital, Seattle, Washington----------	Head Nurse	4 days	Metabolic Research Units, Arthritis and Metabolic Diseases, Heart, and Cancer Services.
Ohio State University Hospital, Columbus, Ohio-----	Head Nurse	2 weeks	Metabolic and Endocrinology Research Units, Arthritis and Metabolic Diseases, Heart, and Cancer Services.
Pratt Clinic, New England Center Hospital, Boston, Massachusetts----------	Assistant Director Head Nurse	2 weeks	Metabolic Research Units, Arthritis and Metabolic Diseases, Heart, and Cancer Services.
Saint Bartholomew's Hospital, London, England----------	Operating room supervisor	2 days	Heart and Cancer surgery.
Heart Disease Control Program, Division of Chronic Diseases, Bureau of State Services, PHS----------	Consultant	3 weeks	Orientation to Heart Service --new aspects of treatment and research.

DAILY AVERAGE CENSUS OF CHILDREN ON
EACH NURSING SERVICE EACH MONTH
DURING FISCAL YEAR 1961

Month	Nursing Service						
	Allergy and Infectious Diseases	Arthritis and Metabolic Diseases	Cancer	Heart	Neurology and Blindness	Psychiatric	Total
	Average	Average	Average	Average	Average	Average	Average
1960 July	4.9	10.3	24.5	16.1	19.4	0	75.9
Aug.	6.7	9.8	23.9	17.6	15.3	0	73.3
Sept.	6.2	13.9	20.1	15.3	17.9	0	73.7
Oct.	6.7	17.4	19.0	13.4	13.4	0	69.8
Nov.	11.2	17.4	18.3	13.2	13.5	0	74.2
Dec.	11.0	17.9	17.6	9.0	11.6	0	66.8
1961 Jan.	9.4	15.2	17.8	8.9	12.6	0	64.4
Feb.	10.8	18.1	19.6	10.2	14.4	0	73.0
March	11.1	16.6	20.1	11.8	11.5	0	71.1
April	12.4	13.4	14.5	17.5	12.6	0	70.8
May	10.7	12.6	21.8	11.7	8.6	0	65.3
June	6.2	19.7	19.7	14.1	12.5	0	72.3
Yearly average	9.0	15.2	19.7	13.2	13.4	0	70.8
Percent of total	12.7	21.6	27.8	18.7	18.9	0	100.0

DAILY AVERAGE PEDIATRIC CENSUS
EACH MONTH, FISCAL YEAR 1961

Month	Under 2 years of age	2-5 years of age	6-13 years of age	14-16 years of age	Total
	Average	Average	Average	Average	Average
1960 July	11.8	19.0	37.8	7.3	75.9
Aug.	13.4	21.8	32.9	5.3	73.3
Sept.	15.1	24.5	30.5	3.6	73.7
Oct.	13.4	22.7	28.3	5.4	69.8
Nov.	13.0	25.7	31.0	4.6	74.2
Dec.	10.4	20.4	29.2	6.6	66.8
1961 Jan.	11.0	19.4	24.3	9.6	64.4
Feb.	12.8	24.4	23.7	12.1	73.0
March	9.9	26.4	23.6	11.2	71.1
April	10.8	19.1	26.4	14.3	70.8
May	11.8	20.3	20.4	12.9	65.3
June	11.1	17.6	31.4	12.2	72.3
Yearly average	12.0	21.7	28.3	8.7	70.8
Percent of total	17.0	30.7	40.0	12.3	100.0

PHS-NIH
Individual Project Report
Calendar Year 1961

CC-51
Serial No.

Part A.

Project Title:

A study of the Activities of Nursing Personnel on the Nursing Units of the Clinical Center, NIH.

Principal Investigator:

Dr. Jane Wilcox, Special Assistant for Nursing Research, Nursing Department, Clinical Center.

Other Investigators:

Research Assistant: Miss Florence Seidler
Observers: Miss Jean Brotslow
Miss Florence Sato

Cooperating Units:

None

Man Years (Calendar Year 1961):

Total: 1 1/2 man years
Professional: 1 man year
Other: 1/2 man year

Project Description:

a. Objectives:

(1) To obtain an overall picture of the activities in which nursing personnel at the Clinical Center are engaged.

(2) To determine whether changes in content or emphasis are indicated in the administration of the nursing service on the nursing units; specifically, whether the assignment of certain non-nursing duties to an administrative assistant to the head nurse may be indicated.

(3) To determine what adaptations in methods of studying nursing activities are necessary in a research institution.

b. Methods Employed:

(1) A sample of five units was studied, which sample included the major nursing services other than the Psychiatric Nursing Service and medical, surgical, and metabolic units.

(2) Activities of nursing personnel were observed by "work sampling." The technique was modified and adapted to fit the situation at the Clinical Center.

(3) A classification of activities in Areas (patient centered, personnel centered, unit centered) and Levels of Skill (professional nurse, clerical, housekeeping, etc.) was used.

(4) From the activities observed, a list of activities suitable for assignment to an administrative assistant to the head nurse was drawn up and trial assignments of such a person in performing these duties were conducted.

c. Major Findings:

(1) Nursing personnel at the Clinical Center appear to be functioning at appropriate levels of skill. No changes seem to be indicated in this regard.

(2) On the average, taking all nursing personnel as a group, the nursing staff divided their time among the four major areas of activity as follows:

	Percent
Patient centered----------	75
Personnel centered----------	5
Unit centered----------	10
Personal or unoccupied----------	10

Patient centered time is somewhat higher than that reported in some institutions and unit centered time somewhat lower.

(3) Since 75 percent of the time of nursing personnel is devoted to patient centered activities, studies of clinical nursing care would seem to be a fruitful area of emphasis for further research and for in-service education.

(4) Although the average amount of time spent by all staff (10%) and by head nurses (15%) in unit centered activities is not great, administrative activities were identified which could be assigned to a non-nurse administrative assistant to the head nurse. Experimental trials showed that such a person could perform these duties successfully. These duties alone, however, were not sufficient to occupy the full time of such a person.

d. Significance

(1) The findings have assisted the Nursing Department to determine needed areas of emphasis for further administrative action and for further research.

(2) The findings have clarified similarities and differences in nursing activities in a research institution as compared with a general hospital.

e. Course of Project:

(1) The collection of data has been completed and reports presented to the Chief and Senior Administrative Staff of the Nursing Department and to the Director of the Clinical Center.

(2) A brief report of the study may later be prepared for distribution or publication.

(3) Further administrative decision and action will be considered in regard to the utilization of an administrative assistant on the nursing units of the Clinical Center.

Part B

Not included.

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

CC-51
Serial No.

Part A

Project Title:

An Exploration of the Use of Television as an Instrument for Making Observations in Studies of Nursing Care.

Principal Investigator:

Dr. Jane Wilcox, Special Assistant for Nursing Research, Nursing Department, Clinical Center.

Other Investigators:

Miss Florence Seidler, Research Assistant

Cooperating Units:

Clinical and Professional Education Branch, Clinical Center.

Man Years (Calendar Year 1961):

Total:	1 man year
Professional:	2/3 man year
Other:	1/3 man year

Project Description:

a. Objectives:

(1) To explore the use of direct monitoring with television cameras and accompanying sound system as a means of observing nursing care while it is being given.

(2) To study the problems involved in this use of television and to determine what kinds of data can be collected.

b. Methods Employed:

(1) The Clinical and Professional Education Branch, Clinical Center, has arranged for and provided to the Nursing Research Program two small vidicon cameras plus monitors and other accessory equipment needed to conduct this study.

(2) Preliminary experimentation has been undertaken in the nursing arts laboratory, classrooms, and offices of the Nursing Education and Nursing Research Programs of the Clinical Center. There have been frequent opportunities to observe staff and students demonstrating and practicing patient care.

(3) Participation in a Clinical Nursing Conference has also provided experience in the use of television to observe nursing care.

(4) An opportunity is now being sought to undertake trials of observing nursing care via television on a nursing unit. If arrangements can be made with an Institute for the use of a patient room in the Clinical Center, a limited pretest of the actual use of television in studying nursing care will be undertaken.

(5) When this explanation of methodology is completed, the intent is to proceed with a full-scale study of nursing practice in bedside nursing care.

c. Major Findings:

(1) In light of the investigations completed to date, television appears to offer great promise as a means of observing nursing care. Final evaluation awaits trial in the nursing unit situation.

(2) The study has also shown that nurses can utilize television equipment of this type quite effectively with a minimum of technical advice and assistance.

(3) The study has also shown that the use of television considerably enhances demonstrations of nursing procedures.

d. Significance:

(1) The development of an effective method for direct observation of nursing care at the bedside will make possible a number of studies of nursing care that are needed at the Clinical Center.

(2) Our evaluation of this method will be useful to others wishing to undertake studies of direct nursing care; an article about our experience to date is in preparation.

(3) Our successful experience in the use of television equipment by nurses with very little technical assistance will also be of value to others.

e. Proposed Course of Project:

(1) It is hoped that arrangements can be made to undertake the experimentation on a nursing unit early in 1962.

(2) Several months will be required to complete the evaluation of television as a research tool.

(3) When this evaluation is completed, it is planned to proceed with a nursing care study using television as a means of making the necessary observations.

Part B

Not included.

NHI - Diet Order: 350 milligrams calcium, neutral ash. For re-evaluation of sarcoidosis. Calcium, phosphorus, and nitrogen studies were done with different levels of calcium, vitamin D, and steroid therapy. Diet maintained two months.

NINDB - Diet Order: 2300 calories, 235 grams carbohydrate, equal protein and fat, 120 milliequivalents sodium, potassium as ordered. To study suspected familial periodic paralysis in a youth.

NIAMD - Diet Order: 50 to 100 grams fat, calculate intakes of calories, fat, protein, carbonydrate. To study cystic fibrosis.

NCI - Diet Order: Metabolic balance study--200 milligrams calcium; 200, magnesium; 600, phosphorus; calories to maintain weight. To study calcium metabolism by metabolic balance and isotopic techniques using Calcium 47, in patient with multiple myeloma.

NIAID - Diet Order: 200 milligrams sodium, high potassium salt substitute; calculate calorie, sodium, and potassium intakes. For nephrosis study.

II. MAJOR PROBLEMS ENCOUNTERED

Cafeteria Operation

Extremely high personnel costs and the need for day and night food service for personnel contributed to the problem of operating the cafeteria on a self-supporting basis as required by law.

Because of the unsound financial status of the cafeteria, the following changes in operation were initiated in an effort to meet the legislative budgetary requirements:

12/25/60 Cafeteria prices raised to off-set wage board employees' pay raise.

a. Sharp decrease in patronage followed and the financial deficit continued.

1/61 To attract customers, a special daily menu of barbecue and frankfurter sandwiches was introduced in one lunch line. Some customers were better satisfied but patronage was insufficient to support the operation.

3/8/61 Reduction in force effected--17 employees separated.

Services curtailed

a. Night service closed and replaced by vending machines serviced and operated by a commercial vendor.

b. One service counter closed (supplemented by commercial vending machines).

c. Breakfast service discontinued.

d. Cafeteria hours reduced to:
11:00 a.m. to 6:30 p.m. - Monday thru Friday

11:00 a.m. to 2:00 p.m.)
and) Saturdays, Sundays and Holidays
5:00 p.m. to 6:30 p.m.)

6/30/61 Cafeteria deficit for fiscal year 1961: $13,612

9/22/61 Public Law 87-290 relating to the Clinical Center Cafeteria was amended to read:

"--operation of facilities for the sale of meals to employees and others at rates determined by said Director to be sufficient to cover the reasonable value of the meals served--."

10/13/61 As directed, cafeteria services were expanded to 7:30 a.m. to 6:30 p.m., Monday thru Friday, and three meal periods on week-ends and holidays; prices reverted to those of December 19, 1960.

11/30/61 Cafeteria operation deficit, $8,177 (fiscal year 1962).

12/8/61 Wage board pay increase--obviously will add to the problem.

Workload fluctuations, although accepted as a part of the research environment, present a problem with a fixed staff and limited budget, and are influenced, in the Nutrition Department, by nutritional aspects of research studies.

An excellent example of the workload change is that experienced in the mental health program. With increasing research interest in the biochemical aspects of mental diseases, requests for controlled dietary intakes have also increased. Family style meal service formerly used on all five mental health nursing units is now used only on 3-West. Each of the other units has a special type food service. 4-East patients are served in a buffet or cafeteria-like style, their lunches are packed, and supper is delayed for those on pass. 4-West patients, normal volunteers, are served regular or controlled diets on trays in a dining room. 3-East patients receive restricted and controlled diets on trays. The very ill patients on 2-West are served on trays in a dining room, but under close supervision of nursing staff. The Nutrition Department staffing pattern was geared to family style service and the need for additional supervisory positions under the new program was not anticipated when 1962 budget estimates were made.

Another example of workload fluctuation is that resulting from the NIAID cold virus study. Facilities and staff of the 11th floor kitchen were taxed because

of the above-maximum patient census coupled with the need for use of isolation procedures for as many as 30 volunteers at one time on the study.

Increased patient ration cost: Factors influencing the continued rise in this cost are: (1) the wage board personnel pay raise in December 1960; (2) the added personnel cost of the employee health benefit insurance plan (approximately $5,000 per year for patient area staff); (3) rising raw food costs; and (4) only 66% utilization of metabolic kitchen facilities.

Patient Ration Costs

Fiscal Year:	1959	1960	1961	1962 (thru 9/61)
Personnel :	$6.97 (80%)	$7.75 (81%)	$8.11 (81%)	$8.29 (80%)
Raw Food :	1.53	1.58	1.63	1.63
Sup.& Other:	.25	.27	.29	.41 *
Average cost per ration	$8.75	$9.60	$10.03	$10.33

* Due to continued purchase of specialized feeding supplies and equipment for Virus Study (plastic tray liners, bags, etc) and a moderate rise in prices on all supply items.

Personnel Recruitment: Shortages of qualified personnel in the professional, non-professional, and clerical staffs were experienced. The shortage of professional staff was due to the scarcity of dietitians having the qualifications needed for the Clinical Center and the 5-month lead time necessary for recruitment.

A large turnover in clerical staff occurred, due to prevalent grade levels and necessity for more strict enforcement of leave policies in a hospital environment and the consequent inability to compete with other areas of NIH for qualified clerical personnel.

In the absence of a Civil Service register of applicants eligible for non-professional positions, appointments were made on a temporary basis. As of November 30, 1961, 15% of the non-professional staff were serving under temporary appointment, pending establishment of the register.

Continuing problems include prevention of insect infestation; noise in the patient area; the need for constant maintenance of equipment and facilities; insufficient space--especially for training, a much needed laboratory for food analysis, and a test kitchen; and finding sufficient time for consultation with and assuring many visitors cordial and informative tours through the Department.

III. ACCOMPLISHMENTS, CHANGES, AND IMPROVEMENTS

During fiscal year 1961 the Nutrition Department provided 28,102 recorded daily dietary intakes (an average of 77 a day), 402,311 patient meals and weighed

food on 168,612 individual trays. 210 diet aliquots (630 meals) were weighed and provided for laboratory analysis; 11,540 patient days of fluid intakes were measured; and 269 patients were given individual discharge or follow-up diet instructions, and their complete nutrition histories taken.

Twelve floor kitchens, a formula room, the main kitchen, and the 3-B (NCI) and 9th (NIAMD) metabolic kitchens were operated the full 12 months of the year. The 7th (NHI) metabolic kitchen was open less than 11 months and the 12th (NCI) was open 9½ months.

Procedures were reviewed, improved, and established as needed throughout the department. Of particular note were the procedural changes made to accommodate the increased demands of the 11th floor virus studies.

Being recognized as best equipped for the task, during fiscal year 1961 the Nutrition Department trained 12 dietitians from 10 institutions in dietary techniques and procedures needed for the development of metabolic research kitchen units for medical research programs receiving NIH grants.

In conjunction with representatives of the Medical Center, Department of the Navy, Bethesda, Maryland and the NIH Board of Civil Service Examiners, the Nutrition Department completed a civil service examination for non-professional positions. A register of eligibles is anticipated by spring 1962.

The revision of the Manual of Diets and Procedures was completed. Prepared as a guide for physicians, nurses, and dietitians of the Clinical Center of the National Institutes of Health, it was approved by the Director, Associate Director, and Assistant Director of the Clinical Center; a committee of representatives from the Nursing, Clinical Pathology, and X-ray Departments of the Clinical Center; and senior investigators from each of the 7 National Institutes of Health.

Since the activities of the Clinical Center are devoted chiefly to research, the manual was prepared specifically to meet its needs. The procedures outlined in it may differ somewhat from those of standard manuals of hospital diets, and in many instances are not applicable to situations outside the environment of the Clinical Center.

The Chief, Nutrition Department, was invited to participate in the Third International Congress for Dietitians in London, in July 1961. A paper entitled, "Dietary Control for Balance Studies" was presented.

Other Nutrition Department accomplishments consisted of the development and preparation of an instruction booklet for out-patients of National Heart Institute; completion of the revision of the Patient Food Portion Manual; continuation of the project on standardizing bakery recipes--(so far 349 recipes were tested 1 to 3 times each); development of a form for rating employees on both performance and promotion eligibility in one operation; conducted a survey which revealed that the Clinical Center dietitian staffing pattern meets the research need in that it allows the dietitian sufficient

time to devote to professional duties to take her place as an active and productive member of the research team in accordance with Clinical Center organization policy.

IV. PROPOSED FUTURE OBJECTIVES

While the Nutrition Department's objectives are many and varied, some of them are long range. The department's plans for the near future include: Reorganization of the Main Kitchen, using a kitchen manager in charge instead of supervising dietitians; revision of specifications for perishable foods used by the department; a second evaluation of the practice of restricting canned food items in control diets to one day's run at the cannery; preparation of a manual of instructions on the organization and operation of a metabolic kitchen, for distribution in connection with NIH sponsorship of metabolic kitchen units in university hospitals; editing of the Manual of Current Diet Procedures for printing by GPO; revision of the Diet Calculation Reference Book; and continuation of the training program for dietitians in organizing and operating metabolic kitchen units to service the various new medical research units supported by NIH grants throughout the U.S.A.

ANNUAL REPORT OF PROGRAM ACTIVITIES

Division of Biologics Standards

January - December 1961

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Introduction

The year 1961 represented the Division of Biologics Standards' first full year of operation in its new building. It proved to be a "bitter-sweet" experience in the sense that, while the facilities of Building 29 are excellent and the establishment of most of the Division's activities under one roof has made for better organization, cohesion, and management, space is inadequate for the Division's present and future programs. This was clear in the early construction stages of Building 29. Thus, a great deal of time during the past year has been spent in considering space needs for future DBS programs and in planning for them.

The Division's activities are about equally divided between control and research. The research programs are concerned largely with the basic function of the Division -- the control of biological products -- although by their very nature, some of these activities could well be classified as basic or fundamental research. However, no programs are undertaken initially unless they have direct bearing on the responsibilities of the Division. The activities of the Division -- both control and research -- are therefore product-oriented, and their scope, direction, and intensity are dictated by the need to provide essential information for developing requirements and regulations for the licensing and release of biological products.

Not all of the Division's problems are related to new or developing products. Problems often arise concerning established products. The Division must therefore maintain an active interest in areas of research which are no longer of primary concern to the scientific field as a whole, for example, smallpox and the rickettsial diseases.

The newly developed products, however, create the heaviest and most urgent demands. It is in relation to these products that the Division's facilities and resources need to be increased. Of immediate concern are the live poliovirus and measles vaccines. The actual needs in measles prophylaxis are not yet fully discernable, however, it is certain that two forms of vaccine will eventually be made available -- live attenuated, and inactivated vaccines, with variations of each. Only time and the verdict of the users will determine which type will be the most suitable for immunization against measles. The Division has been active in the development of these vaccines and has clarified many of the problems. The groundwork for their licensing and release once they are ready for commercial use has been established. In the meantime, the Division is faced with the difficult problem of apportioning its resources, which are still strained by the testing, licensing, and release of live poliovirus vaccines.

Research in other fields of infectious diseases is increasingly active, and viral agents are being isolated at an accelerated rate. It appears probable that there will be additional vaccines for respiratory diseases and arbor virus infections. The possibility also exists that a hepatitis vaccine will be developing in the near future. It is in anticipation of these future needs that the Division is endeavoring to obtain an extension of its facilities.

During the past year, the solution of problems relating to the licensing of live poliovirus vaccine was of pressing urgency. These problems involved the presence of adventitious agents in the vaccine and the virus seed used, and the genetic instability of the strains, particularly the Type 3 strain. Now, at the close of the year both of these problems appear to be close to solution. Sensitive methods for detecting SV-40 have been worked out, and the testing methods for determining neurovirulence are sufficiently systematized that the Division can look forward to the licensing of Type 3 live poliovirus vaccine early in 1962. The costly and time-consuming alternative, had the problems not been resolved, would have been to develop new strains.

During 1961 a serious problem developed in the testing of inactivated poliomyelitis vaccine. Residual live SV-40 was detected in some lots of vaccine after inactivation. Fortunately, only about 25 percent of the vaccine lots were affected, but an exhaustive testing program was required by the Division and, since many laboratories were not yet set up to work with cercopithecus kidney tissue cultures (essential for the detection of SV-40), the Division's testing program had to serve as the determining factor in the release of vaccine during the critical period of spring and early summer.

A third concern of the Division during 1961 was the demonstrated instability of the pertussis component of the multiple antigen preparations containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, which made this product -- widely used by pediatricians -- virtually unavailable. An extensive testing program was initiated, and much further work will be required to determine the causes of the instability and to work out methods of overcoming it.

One unhappy experience during 1961 was the necessity of investigating alleged violations of the Biologics Law in the sale of plasma and whole blood. The charges involved the updating of whole blood and the processing of plasma for sale without license. These investigations, carried out under direction of the U. S. Department of Justice, consumed a great deal of the time and energy of the Division's Laboratory of Blood and Blood Products.

A continuing difficulty is the recruitment of suitable personnel, particularly senior scientists willing to engage in the type of scientific work presented by the Division and willing to accept the kind of scientific responsibility which is a necessary component of the mission of the Division.

The more detailed activities of the Division are set forth in the following summaries of the programs of each of the Laboratories.

LABORATORY OF CONTROL ACTIVITIES
(Dr. W. G. Workman, Chief)

Projects 2-5

This Laboratory is responsible for activities dealing directly with licensed establishments in relation to the licensing and control of biological products. It is supported by sections on control tests, pyrogens, and reference standards.

Its activities include:

(a) Determination of eligibility of establishments and of individual biological products for license. This determination is made on the basis of the integrity of management and technical personnel, the physical facilities for manufacturing and testing of products, the scientific and professional qualifications of personnel and the evidence developed by manufacturers and the Division of continued safety, purity, and potency of products, for which an application for license is being evaluated. License applications are reviewed individually when required by an ad hoc committee consisting of appropriate members of the staff of the Division.

(b) Supervision of annual and special inspections of licensed establishments and of those for which an application for license has been made.

(c) Releasing of individual lots of biological products for distribution by manufacturers on the basis of review of manufacturer's and of DBS tests and of any other available information relating to the safety, purity, and potency of the lot of the product.

(d) The establishment and distribution of physical biological standards, reference preparations, and control materials. A small culture collection is also maintained mainly for the Division and for licensed manufacturers.

(e) Review of requirements and regulations now in effect for such constructive revision as needed and the development of requirements and regulations for new products.

(f) Maintenance of close working relations with other laboratories of the Division and other agencies to insure continuous knowledge of information needed for the licensing of establishments and new products and for the testing, release, and control of products already licensed.

The scope of activities carried out by this Laboratory is indicated by the fact that during the twelve month period, December 1, 1960 - November 30, 1961, a total of 6,375 control tests were carried out to insure the sterility, safety, potency, and purity of licensed biological products as follows:

Products for Release	5,680	Tests
Inspection Samples	660	"
Complaint Investigations	35	"
Total	6,375	"

These results served as a basis for the release or rejection of individual lots of products. In addition, 1,586 cooperative service tests were done on biological products not licensed.

During the same period 5,263 lots of biological products were submitted for release by licensed manufacturers. Of these 5,178 lots were released, 23 lots rejected, and 62 lots withdrawn from consideration for release by manufacturers.

To maintain an adequate supply of physical reference standards for use by the licensed manufacturers in their official control testing, it is necessary to prepare and standardize new liquid lots from the primary dried stocks. The number of lots prepared and standardized during the year were: antitoxins - 16, serums - 4, vaccines - 6, toxoids - 6. A total of 333 tests were required to complete a satisfactory standardization of these lots. These tests include flocculation reactions, animal protection tests, animal potency tests, neutralization tests, and a number of specialized tests for specific products.

Standards, reference preparations, and cultures are freeze-dried for greater stability during storage. The following were dried between November 15, 1960 and November 15, 1961:

Cultures	1,497	ampules
Serums	35	"
Vaccines	3,546	"
Viruses	555	"
Toxins	969	"

Official standards, reference, and control preparations currently maintained include 73 items.

Standards, reference preparations, and cultures were distributed to research or control laboratories of licensed and other manufacturers, health departments, and universities in this country and abroad as follows:

Antitoxins	341
Serums	1,475
Vaccines	1,160
Toxins	119
Cultures	475
Viruses	173

LABORATORY OF BACTERIAL PRODUCTS
(Dr. Margaret Pittman, Chief)

Projects 6-18

The research activities of the Laboratory of Bacterial Products proceeded along the lines given in last year's report with the objectives of improving bacterial products and procedures for their standardization. Close association has been maintained with international groups. Mrs. Claire B. Cox, a bacteriologist oriented in biometrics, has strengthened the staff but recruitment of suitably trained personnel for work on bacterial toxins remains

a problem.

One of the pressing problems was the conclusion of the investigation, mentioned in last year's report, on the stability of potency of pertussis vaccine component of the multiple antigen vaccine containing diphtheria and tetanus toxoids and pertussis and poliomyelitis vaccines. It was found that the pertussis antigen was unstable with an overall estimated loss of six percent per month. The acceptance of the findings by the manufacturers was complicated by the fact that samples tested by them had been held in the icebox and showed less loss of potency than did market samples tested by the Division. Data submitted by three state laboratories confirmed the findings. To compensate for loss, requirements for initial potency were increased and the dating period was shortened.

A study was initiated to determine the adequacy of the revised requirements for pertussis vaccine in quadruple antigen vaccine. However, the finding of SV-40 contamination in poliomyelitis vaccine of certain manufacturers curtailed further manufacture of the quadruple antigen vaccine which had in a very short time after its introduction largely replaced the use of triple antigens. An investigation of the cause of deterioration of potency is indicated. One valuable outgrowth of the original problem was the demonstration that variations in immune response of strains of mice may significantly affect the measurement of relative potency of an antigen.

The newly developed quantitative mouse protection test for evaluation of cholera vaccine is now ready for trial use by the manufacturers. Studies on in vitro serological measurement of immune response, on laboratory models of cholera infection and rapid tests for identification of bacteria are being continued by Dr. John C. Feeley.

The recent epidemics of "choleriformis enteritis El Tor" in Hong Kong, the Philippines and a few other areas in the Far East have stimulated interest in the study of cholera outside the endemic area of Pakistan where Dr. Feeley last year cooperated in setting up the bacteriology laboratory of the Pakistan-SEATO Cholera Research Laboratory. At the request of Philippine health authorities, Dr. Feeley participated in a field investigation in Manila where improved bacteriological and serological procedures for diagnosis were introduced. Sera and cultures from the epidemic areas will furnish material for evaluating products for which the Division is responsible. The findings of this investigation have implications in international quarantine regulations. The epidemics demonstrate that El Tor vibrios, indistinguishable from "true" cholera vibrios except in capacity to hemolyze red blood cells, are capable of causing epidemics of a disease as severe as and clinically indistinguishable from cholera. This had not been heretofore generally appreciated.

Dr. Michael F. Barile in cooperation with Mr. R. W. Kolb, LCA, is formulating proposed revisions in the regulatory standards for Schick test toxin (diphtheria) based on results of the study of this product.

Improved methods for detection of contaminating PPLO (pleuropneumonialike organisms) and/or L forms in tissue cell cultures have been devised by

Dr. Barile. His studies are helpful in the formulation of purity standards for certain viral products and appear to be more applicable to viral than bacterial products.

It is anticipated that practical information on the relative merits of different methods of titration of tetanux toxoids and antitoxins will be obtained in the laboratory evaluation of toxoids and antisera relating to the field trial in the Territory of Papua and New Guinea.

Dr. Harold Baer and his group (Section on Allergenic Products) are continuing their studies on the specificity of tuberculin. The problem is very complex but results are encouraging. The present tuberculins, O.T. and P.P.D., contain many reactive components some of which cross with heterologous species of Mycobacterium. The objective of the study is to provide more purified and specific substances for use as regulatory standards for tuberculin.

The allergenic group has initiated a study on development of specific standards for poison ivy extract. Early studies suggest that the active principle may be relatively unstable.

The allergen section continues to serve as a depot and distribution center of ragweed pollen for the Committee on Standardization of Allergens (NIAID). This and other liaison activities are helpful in relation to development of regulatory standards for allergenic products.

Studies on sterility testing procedures were resumed with particular emphasis on detection of contaminating fungi and yeast in biologic products and on influence of preservatives.

An analysis of the results of toxicity tests of 595 lots of pertussis vaccine covering a period of 5 years permitted a revision in the test and a more realistic requirement concerning freedom-from-toxicity of the product.

Considerable time was required to select and assay the unitage of a new lot of standard pertussis vaccine to replace the depleted lot which had been in use since 1953 when a unit of potency was adopted. This freeze-dried standard has been widely distributed, on request, to many national laboratories and research workers.

Routine and special assay tests of pertussis vaccine were increased by 37 percent due to the investigation on stability of pertussis vaccine and complications arising out of a product which was more toxic for mice than other pertussis-vaccine-containing products and for which it was claimed to cause fewer reactions in children. The numbers of tests performed are as follows: Pertussis vaccine potency 310; pertussis vaccine toxicity 312; antipertussis serum 18; Haemophilus influenzae therapeutic and diagnostic sera 10 (grand total, 650). Other regulatory activities of the Laboratory consisted of participation in (a) the formulation of written standards for allergenic products and pertussis vaccine; (b) the review of license applications for manufacture of bacterial products of which tuberculin was most frequently involved; and (c) liaison activities between the Division

and one manufacturer of poliomyelitis vaccines.

LABORATORY OF VIRAL IMMUNOLOGY
(Dr. George A. Hottle, Chief)

Projects 19-32

An important responsibility during the past year has been the control of oral, live, poliovirus vaccine. With various laboratories submitting samples to the Division for evaluation and eventual action on requests for license, a major portion of the resources of this Laboratory have been assigned to this work. A reference virus, lot NA2, has been adopted as the NIH Reference Virus for neurovirulence tests and a supply of this virus has been acquired for distribution to interested laboratories. In addition, supplies of each of the three Sabin strains of poliovirus have been stocked for use as reference preparations for the titration of the finished vaccine. One result of this work has been the licensing of Pfizer, Ltd. of Sandwich, England for Type 1, Poliovirus Vaccine, Live, Oral on August 17, 1961, and for Type 2 Vaccine on October 6, 1961. Other laboratories have been working actively in efforts to qualify for license of each of the three types of vaccine.

The impact of the above work has created a heightened index of activity throughout the entire laboratory. In May of this year, Dr. Paul Gerber was assigned the responsibility for studying the tissue culture properties of the candidate live poliovirus vaccines. Training of new personnel was added to the responsibility for studying markers and extraneous viruses in vaccine samples which were submitted for evaluation by prospective manufacturers. In the Section on Pathology, Dr. Ruth Kirschstein was called upon to enlarge the staff of the histology laboratory and of the animal test unit in order to process tissues from the increased number of monkeys which were utilized in the neurovirulence testing program. Among the 56 samples of vaccine which have been subjected to examination to date, tests on approximately one-fifth have been completed with results which have permitted release of the vaccines. Time consuming or critical tests are performed concurrently with manufacturer's tests, where possible, to avoid delay in identification of problems or of release of vaccine.

At about the same time that the need became apparent for increased effort with the live poliovirus vaccine, Dr. Paul Gerber uncovered a disturbing situation with respect to the Salk poliomyelitis vaccine program by a finding that some lots of vaccine contained living vacuolating virus. A detailed investigation showed that this simian virus (SV-40) was somewhat resistant to inactivation by the formaldehyde level which inactivated poliovirus. The release of Salk vaccine was brought to a temporary halt in early May -- at a time when vaccination programs were underway in many parts of the country. The manufacturers required some time to develop the procedures for testing for SV-40 because supplies of Cercopithecus monkeys were not immediately available. To avoid needless delays, a program of testing each lot of vaccine for SV-40 was carried out in this laboratory, and until August 1, 1961 when the manufacturers were able to arrange the testing adequately, the test results obtained in this laboratory were used as the basis for release

action on both poliomyelitis and adenovirus vaccines.

The control program for poliomyelitis and adenovirus vaccines during the year involved the following examination and release actions:

	Poliomyelitis Vaccines	Adenovirus Vaccines
Samples received	60	20
Vaccines released	59	3
Combined with other antigens	16	15
Vaccines rejected	6	--
Vaccines withdrawn by manufacturer	12	2

In the survey of vaccine for SV-40, the following results were obtained:

Samples	Poliomyelitis Vaccine	Adenovirus Vaccine
Negative	41	6
Positive	15	13

(Above figures refer to actions during reporting period only. This accounts for apparent arithmetic discrepancies). These results indicate that problems in removing SV-40 from adenovirus vaccine present greater obstacles than those involved with poliomyelitis vaccine.

The research program carried out by this laboratory has included studies on pathogenesis of a number of infectious agents by Dr. Kirschstein and Dr. Borman; in addition to the emphasis which they have placed on investigating and organizing a clear cut procedure for reporting the results of neurovirulence tests of the attenuated poliovirus vaccines in monkeys.

Dr. Gerber has been active in studies on the biological and biochemical properties of the vacuolating virus. Dr. Van Hoosier has been studying the immunology and biology of the group of viruses which have been associated with monkeys. Dr. Uhlendorf has studied various aspects of measuring poliovirus antibodies in the serums of a number of animal species. In the latter area Dr. Gerber has been finding that sera from rabbits and goats immunized with poliovirus have contained antibodies of sufficiently high titer to neutralize undiluted poliovirus and provide a means for the search for extraneous viruses in the live, oral, poliovirus vaccine.

The problem of acquiring personnel to carry out our responsibilities has been a most difficult one. The shortage of scientists with training in tissue culture techniques and available for this work is acute. An additional difficulty arose when Dr. Samuel Baron relinquished his place on our staff in order to work in NIAID at the end of his year of training in London with Andrewes and Isaacs.

LABORATORY OF VIROLOGY AND RICKETTSIOLOGY
(Dr. Joseph E. Smadel, Chief)

Projects 33-53

The Laboratory of Virology and Rickettsiology, as befits a unit of the Division of Biologics Standards, devoted most of its efforts during calendar year 1961 to problems related to the prevention, by immunologic means, of diseases of man caused by viral and rickettsial agents. The studies ranged from those with clinical overtones, such as infection of volunteers with SV-40 virus and the immunization of children with live attenuated measles vaccine, to purely laboratory procedures such as the development of a continuous tissue culture cell line derived from Cercopithecus aethiops (African green monkey).

Simian Virus 40 (Vacuolating Virus). A very appreciable effort of the laboratory during the year was devoted to work on SV-40. This simian agent, originally described in the summer of 1960, immediately became of great importance in viral vaccines prepared from monkey kidney tissue cultures. In particular, both living and killed polio vaccines and adenovirus vaccine, all of which had been produced on a large scale and employed in human beings, were found to contain living SV-40 on occasion. The occurrence of this adventitious agent in these vaccines was of such import that their availability was threatened.

Little was known about the agent except that it grew in rhesus kidney cell cultures without producing cytopathogenic changes whereas in the cytoplasm of cercopithecus cell cultures (African green monkey) it regularly caused the formation of characteristic vacuoles. Studies on the agent were initiated by several laboratories in the DBS. The efforts of the LVR were concentrated on the following aspects: (1) The development of simpler tools for working with the agent; these were needed to supplement the diagnostic isolation of the agent in primary cercopithecus cells and its subsequent identification through the use of the neutralization test in such tissue cultures. (2) The accumulation of information on the pathogenesis of the virus for man, monkeys, and other laboratory hosts and, finally, the exploration of the ecology of the disease in monkeys, both in the wild and in the laboratory. It was anticipated that studies along these lines would provide information which would help in the elimination of living SV-40 from vaccines and would, incidentally, add to our knowledge regarding this newly recognized viral agent.

Studies of Dr. J. A. Morris and his associates, in the Section on Respiratory Viruses and in the NIAID, revealed that inoculation of volunteers with relatively large amounts of SV-40 (10^4 $TCID_{50}$) by the respiratory route resulted in inapparent infection which was associated with excretion of virus from the upper respiratory tract of some of the volunteers for a short time and was followed by development of specific antibodies. During the course of the acute infection and during the succeeding 9-12 months, no untoward effects attributable to SV-40 have been observed in the 35 volunteers who knowingly received the agent. Sabin's observation that feeding smaller amounts of SV-40 by mouth to human beings did not result in infection was also confirmed during these investigations using materials supplied by him.

Simian virus 40 administered to susceptible cercopithecus monkeys, produced a systemic infection with viremia but little in the way of obvious disease. Observations on monkeys reaching the laboratories indicated that most of the rhesus, few of the cynomolgus, and almost none of the cercopithecus were infected with SV-40. An expedition to India by Dr. Harry Meyer and an associate revealed that SV-40 was a natural disease of Indian rhesus monkeys inhabiting the jungle. Only about 10 percent of the jungle monkeys were infected, and these were clustered in individual family groups. Continuing observations on the same group of monkeys captured in the jungle, transported to the United States and held under reasonably good isolation conditions in the DBS, demonstrated that SV-40 spread slowly through a group in contrast to measles which spread in monkeys almost as rapidly as among children. Intimate contact or neighborly association seemed to be required for the spread of this simian agent. It was assumed that SV-40 was not indigenous to cynomolgus monkeys of Southeast Asia or to cercopithecus monkeys from Africa, and that when infection did occur in these species it resulted from exposure to infected rhesus monkeys in the course of transportation and holding. Diagnostic tools for isolation and identification of SV-40 have been improved through the application of complement fixing techniques and the employment of a continuous line of cercopithecus cells, developed by Mrs. H. E. Hopps of the LVR, which are fully susceptible to the cytopathogenic effects of SV-40 and unencumbered by any recognizable latent simian agent, including SV-40.

By applying information of the type mentioned above as well as that derived from other sources, it is possible to obtain simian tissue cultures which are free of SV-40 for use in virus research and vaccine production. Dr. B. Eddy of the Section on Experimental Virology, has accumulated information which suggests that simian virus 40 may be associated with the development of sarcomas in experimentally inoculated hamsters.

Measles. During the past several years, progress has been made by many groups in the development of immunizing procedures against measles using both attenuated living and killed vaccines. The DBS has done much to foster and stimulate rapid transition in this field from the basic studies of Enders to the commercial production of such vaccines. In the meantime, Dr. Meyer's Section on General Virology has accumulated experience with live measles vaccine in children and has paid particular attention to the development of standard procedures and reagents which will be needed for the biological control of commercially produced measles vaccines and measles immune gamma globulin. These materials and procedures have been made available to manufacturers and will hasten and simplify the final stages involved in bringing measles vaccine to the physician and his patient.

The degree of attenuation for man of Enders' B level Edmonston strain measles virus is such that it induces a mild but not dangerous form of disease in the vaccinated susceptible child; this is followed by the development of specific antibodies and solid immunity. The somewhat excessive clinical manifestations of the vaccine disease can be essentially eliminated by the concurrent administration of gamma globulin containing an appropriate amount of measles antibody. While such a combined procedure may find common usage in American health practices, it has potential disadvantages when employed in children in developing countries of the world because of the limited supply and rela-

tively high cost of gamma globulin. Although the unmodified vaccine disease is not dangerous in healthy American children, relatively little is known about its severity in children with nutritional deficiencies and heavy parasite loads. In order to determine the severity of the vaccine disease in children in developing areas, a pilot study was begun in Upper Volta, West Africa, in November 1961 by Drs. H. M. Meyer, D. D. Hostetler, and Mrs. B. C. Bernheim of the LVR.

Homologous Serum Jaundice. Dr. J. P. O'Malley and his colleagues published their observations on a newly recognized virus, designated A-1, which appears to bear some relation to the etiological agent of serum hepatitis. The icterogenic pool of human plasma which had induced jaundice in volunteers and which yielded the A-1 agent in tissue culture, elicited antibodies against A-1 in the convalescent volunteers. Perhaps more important was the finding that volunteers infected with different icterogenic pools also developed comparable A-1 antibody response as well as a group of persons who developed jaundice following use of an infected lot of thrombin. The general importance of the A-1 virus in human jaundice and its relation, if any, to the hepatitis viruses of other investigators who have used different materials and methods are being studied.

Typhus. Studies on immunization against epidemic typhus continued along several lines, all of which were extensions of earlier work of Dr. J. A. Morris and Miss E. B. Jackson, their associates at the DBS and their colleagues in other institutions. One of the efforts was concerned with a better understanding of the factor or factors in the commercially prepared inactivated typhus vaccine and in the experimental live attenuated E strain vaccine which are responsible for inducing resistance to infection with virulent strains of Rickettsia prowazeki. Previous work of others had led to acceptance of the idea that resistance of animals to challenge was closely correlated with the presence of circulating toxin neutralizing antibody and roughly correlated with the presence of complement fixing antibodies. Provocative observations mentioned in last year's report, raised the question as to whether resistance unassociated with any detectable antibodies might be induced by vaccine. The laboratory model with which these data were obtained consisted of guinea pigs inoculated with 10 to 100 chick embryo lethal doses of the attenuated E strain. A small proportion of such animals developed antibodies and were resistant but most had no detectable antibodies, yet many of the latter were partially resistant when challenged with a virulent strain (Breinl) of R. prowazeki. Extension and confirmation of the earlier observations now suggest that the small dose of E strain organisms induced a state of immunologic preparedness in the guinea pigs which enabled them to respond in a booster fashion when confronted with rickettsial antigen resulting from the challenge. For the time being, then, it is not necessary to postulate the presence of a hitherto unrecognized antibody which is primarily concerned with resistance.

Studies on another aspect of the booster phenomenon in immunization against typhus employed killed vaccine. Here the idea was to determine the size of the antigenic mass required to elicit a state of immunologic preparedness in contrast to the recognized vaccination regimen which elicits demonstrable antibodies in the majority of persons. Field aspects of these studies,

undertaken in collaboration with the Navy, Army, and University of Maryland, are essentially completed but not the testing of specimens. Nevertheless, observations on groups of 75 Marines inoculated with progressively diminishing doses of commercial vaccine have revealed that a single injection of a 1:64 dilution resulted in the appearance of small but detectable amounts of antibodies in about 40 percent of persons while 10 percent responded to the 1:256 dilution. The antibody response of these groups, particularly those with a large proportion of negatives, to the booster injection of 0.5 ml. of undiluted vaccine should provide crucial data on the minimum antigenic mass of typhus antigen required to prepare persons for a booster response. The ultimate objective of this work is to find a means of inducing the prepared state of recruits by inoculating a multiple vaccine with a small typhus component. Such prepared persons could then be rendered solidly resistant by a booster dose of monovalent typhus vaccine given when subjected to risk of exposure.

New Antimicrobial Agents. Dr. C. P. Li, the members of his immediate group and his collaborators in Bethesda, have continued to study the antibacterial and antiviral substances found in mollusks. During the year, they obtained in a highly purified state that fraction from abalone which has antibacterial activity. The purified material, which was homogeneous by ultracentrifugation, yielded 18 amino-acids on hydrolysis and contained some carbohydrate. The substance was considered to be a mucoprotein. They extended the study to oysters and found antiviral materials to be present. The heat stable oyster material, like the abalone, inhibited paralytic disease in mice caused by poliomyelitis virus and interfered with growth of influenza virus in tissue cultures. The physicochemical properties of the antiviral material are under investigation.

Intracellular Infections. Studies designed to gain a better understanding of Brill's disease and the typhoid carrier, employing tissue culture models infected with rickettsiae or salmonella were essentially abandoned curing the year because of the press of work on SV-40. However, before this happened, experiments dealing with the cure of such tissue culture models by antibiotic therapy were completed; references are included in the bibiography of one of the projects of the laboratory. In the future, attention will be devoted to a study of the means by which the infected cell, without the aid of antibiotics, begins to overpower the invading rickettsial organisms. Earlier observations had indicated that under certain conditions of deficient nutrition of the tissue culture cells, the rickettsiae are killed off at almost the same rate as in the well-nourished cell maintained in the presence of specific antirickettsial antibiotics.

Administrative Changes in the LVR. During the summer of 1961, Dr. L. Kilham left the laboratory to assume the position of Associate Professor, Department of Microbiology, Dartmouth Medical School. His research interests had been largely focused on animal tumors of viral origin. This was a field which also interested Dr. B. E. Eddy. A new Section on Experimental Virology was created with Dr. Eddy in charge; this Section has a broad mission including cancer virology. Dr. C. P. Li was designated Chief, Section on Virus Biology, a position formally occupied by Dr. Kilham. Dr. J. A. Morris, formally Chief, Section on Basic Virology and Rickettsiology, was made Chief, Section on Respiratory Viruses. Dr. Smadel assumed the duties of Acting

Head of Dr. Morris' old Section.

There have been a number of changes in technical personnel during the period. New people have been recruited, several have transferred within the laboratory and several have moved to other laboratories within the DBS.

In general, the laboratory is beginning to form itself into a more homogeneous group with more clearly defined missions and interests. Additional recruiting is indicated with the view to strengthening in depth the scientific talents of the groups dealing with respiratory viruses and with rickettsiae. In addition, future planning includes consideration of the development, when space and facilities become available, of a group interested in immunoprophylaxis against the arbor viruses.

LABORATORY OF BIOPHYSICS AND BIOCHEMISTRY
(Dr. C. W. Hiatt, Chief)

Projects 54-55

The Laboratory of Biophysics and Biochemistry was established in 1960 to provide within DBS a centralized facility for biophysical instrumentation and to conduct a program of research in the physical sciences related to control of biological products.

The Laboratory is divided into two units: one engaged in physical measurements, the other in experimental research organized around physical concepts and disciplines but not necessarily utilizing physical measurements or complex instruments. Activities of either unit can freely cross boundaries of the several fields of biology without any restriction resulting from prior specialization in a limited biological subject area.

The physical instrumentation unit consists of two trained research assistants specializing in the operation of the ultracentrifuge and electron microscope. More than 60 percent of the man hours devoted to these two instruments have been applied to service activities or cooperative research in conjunction with other laboratories. As an independent intramural research project, the members of this unit have been engaged in developing and evaluating methods for the physical and chemical characterization of animal viruses. This function, which will increase in productivity as the investigators gain in experience and proficiency, has an important bearing upon the regulatory responsibilities of DBS since identification and description of adventitious viruses in viral vaccines constitutes a major problem.

The research conducted by the other three professional members of this Laboratory, although quite different in approach, is also related to the problem of adventitious viruses in viral vaccines. A long-range study of methods of inactivating viruses has led to development of the basic concept of "differential inactivation" as a means of eliminating contaminating viruses in live virus vaccines, and practical as well as theoretical advances have been made in this area.

LABORATORY OF BLOOD AND BLOOD PRODUCTS
(Dr. J. T. Tripp, Chief)

Projects 56-59

Research Activities. The research program of the Laboratory of Blood and Blood Products has as its goal the improvement of testing procedures used for the control of biological products derived from blood. The various projects cover all phases of blood collection, processing, shipment, and storage. Investigations encompass not only improvements for existing control procedures but also are directed toward the perfection of new tests for existing products as well as new products.

Many of these new products which are under development have immunological or biological activities for which there are no established test criteria. As a result, it is often required that research of a fundamental nature be carried out before definitive and useful control tests can be devised. An example of this is the continuing investigation of the components of the coagulation system which is being pursued with vigor in the Laboratory. Before protocols for meaningful control tests can be set up, it has been necessary to do considerable work on the purification of these components. Thus the successful preparation of a plasminogen free fibrinogen has brought one step closer the defining of control tests that will be independent of the reagents used.

Other examples of research interests designed to strengthen the control program include:

Studies of the effects of freezing, thawing, and drying on various elements of blood. Some of the newer techniques offer intriguing possibilities for the preservation of ordinarily labile components.

Studies of methods of collection of platelets and their use in specific disease states. Particularly interesting are the effects on donors of repeated large platelet donations. This information leads to criteria for effective standards for platelets as a licensed biological.

A long-term interest is the effect of storage, that is, temperature, time, light, container material, etc. on the properties of whole plasma and the separate plasma proteins. One biological, Normal Serum Albumin (Human) now has a dating period of as long as 10 years under certain specified conditions. It is therefore of interest to study by all means available the nature of any changes in plasma protein molecules brought about as a result of aging.

"Extramural" Research and Other Activities. The "extramural" program of this Laboratory has no formal organized basis but nevertheless is an important part of the overall program. Because of the nature of the control functions of the Laboratory, many contacts are made with outside organizations for various reasons. Examples of these outside interests include:

During the year, the Laboratory completed its part of the experimental aspects of study on interchangeability of disposable transfusion equipment being carried out in cooperation with the American Standards Association and the International Standards Organization.

The Laboratory participates in a program, in cooperation with several national groups, of storing blood of rare and unusual types at subzero temperatures. This blood is available to meet actual transfusion needs. In addition, this program offers an excellent opportunity to evaluate under actual conditions the best procedures for storing, shipping, and administering blood that has been stored utilizing these relatively new techniques.

The rapid expansion in the last few years of the number of licensed establishments, coupled with the increasing complexity of techniques used in blood banking has created a need for an effective means of disseminating up-to-date information on details of the techniques. The Laboratory has devoted as much time as possible in working with other groups on this problem.

In addition to the research activities outlined in the accompanying project reports, designed to complement and support control functions, the Laboratory of Blood and Blood Products has carried out its primary function of controlling the safety, purity, and potency of blood and blood products. Chief among these control functions are the following:

1. As required by regulations, each establishment producing blood products was inspected at least once during the fiscal year. During the year, there have been 10 qualified inspectors available to perform this work in addition to their other duties. In fiscal 1961, the qualified inspectors performed a total of 304 inspections requiring 374 man days on travel status. In the last quarter of this calendar year, two major investigations of possible violations of the Public Health Service Act have taken a significant amount of effort on the part of the Laboratory staff. As of December 1, 1961 these two investigations have required 220 man days on travel status with the task still not completed. As a result, some research projects and other work not of immediate importance have been delayed.

2. Control testing has been carried out on the various blood and blood products produced by 157 licensees operating 229 principle locations and 219 donor centers and other subsidiary facilities. These licensees hold 593 product licenses for blood and blood products. This control testing includes all of the physical, chemical, immunological and related testing found necessary for action on the various blood products submitted for licensure or release or as the result of inspections. In 1961 control testing involved over 2,200 lots of blood products including 410 inspection samples. In excess of 14,000 tests were performed on these products.

3. License applications for 25 blood products were reviewed and the licenses were granted. Four licenses were granted for establishments to produce blood and blood products. There are 12 licenses pending.

4. Labels and circulars were reviewed for all biological products from licensed manufacturers. Over 500 groups of labels and circulars were received and reviewed for compliance with the regulations. This work involved the labels and circulars from the currently 193 licensed establishments which are licensed for 284 different biological products and who hold 1,213 active product licenses each having its own label.

5. Reference standards are maintained for seven blood products. Work was continued on 10 new preparations for ultimate adoption.

6. The preparation of regulations and standards for the control of blood products has continued. Additional Standards for Packed Red Blood Cells (Human) and for Heparinized Whole Blood (Human) have had final publication in the Federal Register. A draft of Additional Standards for Plasma (Human) has been circulated for comment before initial publication in the Federal Register.

7. The blood bank serving the needs of patients in the Clinical Center is operated as a Section of this Laboratory. This experience helps to maintain a realistic attitude toward control functions as the Laboratory continues to be aware of the requirements of meeting the needs of a research hospital. The equivalent of over 11,000 units of blood were processed in the blood bank in 1961 for patient care either in the form of whole blood or as special blood derivatives. Emphasis is being placed on the importance of fresh blood to support surgery utilizing extracorporeal circulation and on the use of platelet therapy in the treatment of thrombocytopenic states. The increased need for platelets has resulted in increased use of plasmapheresis.

8. An additional 453 NIH employees were grouped and typed for inclusion in the panel of typed donors. These employees are available as a valuable source of extensively characterized red cells for use in the control and research program of the Laboratory. At present there are 1,050 employees listed on the panel which is utilized as least weekly.

9. When travel schedules permit members of the Laboratory staff are participating in blood bank workshops and training programs. This activity, while performed on an informal basis, nevertheless allows more efficient dissemination and illustration of information on blood banking techniques. Ways and means are being explored that will allow greater participation by the Laboratory's trained staff in these training programs as a contribution to the raising of the standards of achievement of blood banks.

10. During the year, the Laboratory completed the experimental aspects of a study on interchangeability of disposable transfusion equipment being carried out in cooperation with the American Standards Association and the International Standards Organization. A report of this work is in preparation.

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PHS-NIH
Individual Project Report
Calendar Year 1961

Program direction and administration for the Division of Biologics Standards is centered in the Office of the Director, with centralization of administrative procedures relating to personnel, travel, supply and accounting. Major objectives are determined and program responsibilities are assigned to the operating units within the Division. For each major area, staffing patterns are developed and are continually reevaluated in relation to program changes. The required financial support is determined for each area in relation to the Division's total budget. A major activity of the Office of the Director is the maintenance of the proper balance between the control activities and the research programs, the latter being supported to the degree that such investigations are required in order to meet the control responsibilities of the Division.

The Director working with members of his immediate staff, including a legal assistant, conducts a continuing review of existing regulations for the control of biological products, making revisions as necessary and also develops additional regulations as required for new products.

Close and continuous liaison is maintained with technical representatives of industry. Frequent meetings are held between members of the Division's professional and administrative staff and groups of manufacturers who are concerned with common problems. In addition, approximately 200 conferences are held each year with technical representatives of manufacturers who desire to discuss production and testing programs peculiar to their own organization.

The Office of the Director services the Board of Scientific Counselors, the Technical Committee on Poliomyelitis Vaccine, the Public Health Service Committee on Live Attenuated Poliomyelitis Vaccine, as well as numerous Ad Hoc Committees which are appointed from time to time to consider matters relating to the control of biological products.

The Director, or his designated representatives, attends meetings of committees and advisory groups of the World Health Organization, as well as those of the National Research Council, Armed Forces Epidemiological Board, etc. Division scientists have continued to take an active part in the World Health Organization's program for the development of international uniformity of biological products.

Within the Office of the Director, the Information Office continues to be concerned with, (1) communications through such media as press, radio, television, publications and exhibits of information to the public on the Division's control and research activities, and (2) internal communication of such information through reports to the Director, NIH, and to the Surgeon General as well as to the Department and to the Congress.

During 1961 considerable effort was devoted to: 1) enforcement activities in the blood and blood products field; 2) problems relating to measles vaccines; and 3) the licensing of live poliovirus vaccine.

During 1961 the resources of the Division were severely taxed by the growing workload and it was possible to meet these increased demands only by diverting personnel and resources from other projects of lower priority and by postponing investigations in other areas. Since it was apparent that these increased responsibilities were not of a temporary nature which could continue to be met by such emergency measures, long range plans were developed and an increase in support was requested.

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Individual Project Report
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Part A.

Project Title: Control Testing and Investigations Related to Control of Biological Products.

Principal Investigator: Mr. Robert W. Kolb

Other Investigators: Mr. Otis L. Green
Mr. Harry T. Aylor

Cooperating Units: None

Man Years:
Total: 9
Professional: 3
Other: 6

Project Description:

The principal objective of this project is to assure the compliance of licensed biological products with standards established under the biologics control provisions of the Public Health Service Act. Individual lots of biological products are recommended for release on the basis of evaluation of the manufacturer's and Division of Biologics Standards tests. The evaluation includes control testing for sterility, safety, potency and purity as required for licensed biological products including antitoxins, therapeutic immune serums, blood and blood derivatives, bacterial vaccines, toxins and toxoids, multiple antigens, viral and rickettsial vaccines, diagnostic substances for dermal tests, antivenins, venoms and allergenic extracts. Supplemental to control testing are the following activities: (a) Evaluation of manufacturers' protocols of tests on lots of biological products for compliance with minimum standards; (b) preparation of releases; (c) maintenance of a permanent record and filing system for releases, protocols of manufacturers' tests, and samples of all biological products submitted to the Division and (d) a continuing reevaluation of methods and operations relative to the establishment of efficient control measures.

In addition to the above activities are a number of research and other functions which have been related to this program as follows: (a) Research dealing with the development of new methods for the

control of biological products and designed to improve existing in vivo and in vitro methods of testing; (b) research concerned with the study of stability of biological products and with the development and standardization of new biological preparations; (c) participation in the establishment and product licensing program, which involves the review and screening of new license applications, testing of products submitted in support of such applications, prelicensing inspections and preparation of official reports; (d) participation in the annual inspection program of licensed biological establishments and the control testing of inspection samples collected; (e) participation in the revision and formulation of regulations and additional standards for biological products; (f) cooperative investigations with intraagency laboratories, commercial establishments, domestic and foreign governmental agencies in which studies and assays are carried out on numerous biological and pharmaceutical preparations; and (g) the orientation and training of new government personnel and visitors from other domestic and foreign health laboratories and institutions in biological control testing methods and related operations as conducted within the Division.

Major Findings and Accomplishments:

I. Control Testing Activities

(a) During the past 12 months (i.e., December 1, 1960 through November 30, 1961) biological products have been tested for conformance to Public Health Service standards, regulations, and requirements. A total of 6,375 control tests were carried out in the Laboratory of Control Activities to insure the sterility, safety, potency and purity of licensed biological products. These are summarized as follows:

Products for Release	5,680	Tests
Inspection Samples	660	"
Complaint Investigations	35	"
Total	6,375	"

The data obtained served as the bases of recommendations for acceptance or rejection of the individual lots examined.

In addition 1,586 cooperative service tests were done on biological products not licensed.

(b) A permanent record and filing system for releases, protocols of manufacturers' tests and samples of all biological products submitted to the Division of Biologics Standards was maintained. During the same period indicated above 5,263 lots of biological products were submitted for release by licensed manufacturers. Of these 5,178 lots were released, 23 lots

were rejected and 62 lots were withdrawn from consideration for release by the manufacturers.

(c) Conducted 3 complaint and 18 special investigations on biological products and matters related to control activities during the year. Reports and recommendations for action were made to the Chief, Laboratory of Control Activities.

(d) Quality control evaluations were made during the year of data collected in official potency tests run on rabies vaccines, smallpox vaccines, typhoid vaccines, and poliomyelitis immune globulins (Lansing antibody titrations). Tables and charts were made plotting the respective end-point reactions obtained with the NIH reference materials in the various tests. Results showed that most of the potency assays conducted fell within 2 standard deviation limits.

This information has been helpful in studying variable factors in the test systems, in considering possible modifications or improvements in the laboratory control methods, and in keeping check on the continued stability and effectiveness of official reference standards.

II. Research

In addition to the above control testing, 81 research experiments were carried out in connection with the various projects under way. Brief summaries of these studies are given as follows:

(a) The cooperative project with Dr. M. Barile, Laboratory of Bacterial Products, DBS, on the development and standardization of a reference diphtheria toxin for the Schick test, was continued during the year. The preparation of a freeze dried toxin for use as a standard in the laboratory control of Diphtheria Toxin for the Schick Test was completed. In standardizing the toxin, studies were carried out to check the potency characteristics of the toxin and to determine any change due to the drying process. In other studies, comparisons were made of the potency and antitoxin combining abilities of the proposed standard and the International Schick Toxin Standard. Also, a suitable guinea pig skin test method, which incorporates the use of the proposed standard for measuring the potency of Diphtheria Toxin for the Schick Test, was developed. In conjunction with this method evaluations were made of its reproducibility and its usefulness under routine control test conditions. A report summarizing the results of the above studies has been submitted for review. In addition, standards for

Diphtheria Toxin for the Schick Test have been written and included in the above report. It is anticipated that a manuscript for publication will be written describing the proposed potency assay of Diphtheria Toxin for the Schick Test.

(b) The cooperative study with Dr. E. B. Seligmann on the standardization of an official DBS Reference Smallpox Vaccine was continued during the year. Experiments comparing the potency of the proposed standard to that of a current NIH control vaccine, Lot 1b as measured by the modified rabbit scarification technique have been conducted. A summary of the results of these experiments together with other data have been assembled and used in an official report to licensed manufacturers of Smallpox Vaccine.

Other studies on the stability of the proposed standard vaccine under varying conditions of storage and the variability of potency among ampules from different drying runs are to be continued.

As soon as sufficient data becomes available from these studies and licensed manufacturers have had an opportunity to comment on the above report and submit supplemental data on the proposed standard vaccine, it is anticipated that this information will be used as a basis for the establishment of additional standards for the control of smallpox vaccine.

(c) Two reports on earlier studies carried out with smallpox vaccines have been completed during the year. These papers were submitted to the Bulletin of the World Health Organization and were accepted for publication. (See Part B of the report for publications).

(d) Studies were continued on methods of potency assay for the fluid diphtheria component of Tetanus and Diphtheria Toxoids Combined (For Adult Use) in order to extend standards to cover this product. In cooperation with Dr. E. B. Seligmann, a fluid reference toxoid and dried reference diphtheria toxin were prepared and are in process of standardization. Results of experimental data to date have led to the preparation of a tentative draft of requirements for the product, which has been submitted to licensed manufacturers for review and comment. As soon as sufficient additional data have been collected a final draft of standards for the product will be drawn up.

(e) A collaborative study has been initiated with Dr. Wm. R. Bronson, Chief, Blood Bank Section, Laboratory of Blood

and Blood Products, on the incidence of contamination of banked blood following the use of various skin preparation techniques. Initial studies on the design of a closed blood collection and culturing system have been completed. Specifications for blood collection and culturing units were drawn up and submitted to a commercial manufacturer for assembly. Additional studies will continue as soon as this special equipment becomes available. It is anticipated that this project will provide valuable basic information on the incidence of contamination during blood collections and will aid in the revision of the standards for Whole Blood (Human).

III. Supportive Control Activities

(a) During the current year, numerous establishment and product applications were submitted for review and consideration for license. Usually these are referred to ad hoc committees for prescreening and careful review for compliance with regulations and requirements. Personnel of this section participated in the review and processing of such applications during the year. Also, involved was the control testing of the products submitted in support of license applications. Complete reports and recommendations were made following the review of 17 establishment and 43 product license applications.

(b) Participated in the annual inspection program of biological establishments by carrying out 1 prelicensing, and 22 regular inspections. Official reports and recommendations were made on all establishments visited.

(c) Participated in the preliminary drafting of 1) standards for the following products: Diphtheria Toxin for the Schick Test, Allergenic Extracts, Tetanus Antitoxin, Diphtheria Antitoxin, Gas Gangrene Antitoxins; and 2) dating periods for biological products.

(d) Thirteen visitors representing 8 foreign countries were given orientation and training in control testing and related activities during 1961. The length of the visitations ranged from several hours to 2 days.

IV. Proposed Course of Project

The proposed course is to continue the control testing, research and related objectives with increasing efficiency and attempt to reach conclusions on research projects in as satisfactory and expeditious manner as possible.

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Part B.

I. Publications:

1. Kolb, Robert W.; Cox, Claire B.; and Aylor, Harry T.

   Improvements in the Rabbit Scarification Technique for the Potency Assay of Smallpox Vaccine. Bulletin of the World Health Organization; 25: 19-24; 1961

2. Kolb, Robert W.; Cutchins, Ernest C.; Jones, Wm. P.; and Aylor, Harry T.

   A Comparison of the Rabbit Scarification Technique with Titrations in Cell Cultures for the Potency Assay of Smallpox Vaccine. Bulletin of the World Health Organization; 25: 25-32; 1961

II. Awards:

1. Mr. Harry T. Aylor received a sustained superior work performance award during the year.

Serial No. DBS 4
1. Control Activities
2. Pyrogens
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Section on Pyrogens

Principal Investigator: Harry W. Burruss

Other Investigators: None

Cooperating Units: None

Man Years
Total: 3
Professional: 1
Other: 2

Patient Days: None

Project Description:

The primary responsibility of this section is the testing of certain licensed biological products to determine their safety, purity, and stability as defined in the control regulations under the Public Health Service Act. These biological products, especially the blood products of human and animal origin, are tested for pyrogenicity; their purity is determined in part by total solids content; and moisture determinations are made as a measure of stability of dried products. The principal products for pyrogen testing, which are submitted by licensed manufacturers for release, include streptokinase-streptodornase, vaccines, antivenins, antitoxins, blood albumin, globulin, fibrinogen, fibrinolysin, plasma, and serums.

A total of 1112 samples were tested for pyrogenicity during the year which required the use of approximately 3425 rabbits. This figure includes 588 samples submitted for release, 145 for the Laboratory of Blood and Blood Products, 361 pharmaceutical preparations from the NIH Clinical Center Pharmacy, 11 complaints, and 7 products from the NIH Media Department and Cancer Institute. Studies were made to determined the test dose in rabbits on pharmaceutical products for which no pyrogen test dose had been established.

improvement of methods of preserving and storing standards, such as by freezing and drying, so that their potency may be maintained, selection or development of standard preparations which will yield clear-cut end points in control testing performed by all manufacturers, and correlation of these standards where possible with those established in other countries or with International Standards.

Major Findings and Accomplishments:

(a) In order to maintain an adequate supply of physical reference standards for use by the licensed manufacturers in their official control testing it is necessary to prepare and standardize new liquid lots from the primary dried stocks. The number of lots prepared and standardized during the year were antitoxins - 16, serums - 4, vaccines - 6, and toxoids - 6. A total of 333 tests were required to complete a satisfactory standardization of these lots. These tests include flocculation reactions, animal protection tests, animal potency tests, neutralization tests, and a number of specialized tests for specific products.

(b) Standard and Reference preparations and cultures are freeze-dried for greater stability during storage. This Section dried the following between November 15, 1960 and November 15, 1961:

Cultures	1497 ampules
Serums	35 ampules
Vaccines	3546 ampules
Viruses	555 ampules
Toxins	969 ampules

(c) This Section distributed to commercial houses, health departments, universities, and foreign countries the following Standard and Reference preparations:

Antitoxins	341
Serums	1475
Vaccines	1160
Toxins	119
Cultures	475
Viruses	173

(d) A culture collection of organisms used in the production and testing of biological products is maintained by this Section. Official Standard, Reference and Control preparations currently maintained are:

1. Standard Preparations

Bacterial Products

Botulinus Antitoxin, Type A
Botulinus Antitoxin, Type B
Diphtheria Antitoxin
Dysentery Antitoxin (Shiga)
Histolyticus Antitoxin
Oedematiens Antitoxin
Perfringens Antitoxin (Welchii)
Pertussis Vaccine
Opacity Standard for Pertussis Vaccine
Opacity Standard for Typhoid Vaccine
Scarlet Fever Streptococcus Antitoxin
Sordelli Antitoxin
Staphylococcus Antitoxin
Tetanus Antitoxin
Old Tuberculin
PPD of Tuberculin
Vibrion Septique Antitoxin

Viral Products

Antirabies Serum

Blood Products

Thrombin

2. Reference Preparations

Bacterial Products

Botulinus Antitoxin, Type C
Botulinus Toxin, Type A
Botulinus Toxin, Type B
Cholera Opacity Reference
Diphtheria Toxoid (AP)
Diphtheria Toxoid (Fluid)
Diphtheria Flocculating Serum
Haemophilus influenzae Typing Sera,
Types a,b,c,d,e,f
Histolyticus Toxin
Histoplasmin
Nitrogen Reference
Oedematiens Toxin
Perfringens Toxin
Plague Vaccine
Tetanus Toxoid (AP)
Tetanus Toxoid (Fluid)
Tetanus Flocculating Serum

Typhoid Vaccine
Typhoid Turbidity Reference

Viral Products

Adenovirus Vaccine Types 3,4,7
Adenovirus Crude Fluid, Type 3, Strain JF
Influenza Virus Vaccine, Civilian Formula
Influenza Virus Vaccine, Military Formula
Influenza Virus Vaccine for CCA Determinations
Measles Serum
Mumps Serum
Poliomyelitis Immune Globulin
Poliomyelitis Serum
Poliomyelitis Vaccine, Type 1,2,3
Poliomyelitis Virus, Type 1
Rabies Vaccine
Rabies Challenge Virus
Rabies Production Virus
Smallpox Vaccine
Typhus Serum

Blood Products

Anti-A Blood Grouping Serum
Anti-B Blood Grouping Serum
Anti-Rh_o (Anti-D) Typing Serum
Blood Group Substances A & B
Coomb's Anti-Human Serum
Fibrinogen

3. Control Preparations

Bacterial Products

Antimeningococcic Serum
Hemophilus Influenzae Antiserum, Type b
Scarlet Fever Streptococcus Toxin
Sordelli Toxin
Staphylococcus Toxin
Tetanus Toxin
Vibrion Septique Toxin

(3) Yellow Fever Vaccine manufactured under U. S. Government license has been tested for conformance to the official regulations governing its production. A total of 220 lots were tested for potency, 48 of which were tested for safety, during the year.

II. Proposed Course of Project:

An active research program has been initiatiatedto provide basic data on the properties of existing and new standard preparations. A program designed to maintain a continuing, evaluation of the stability of each physical standard preparation is in effect. A program to gradually improve existing preparations if improvement is necessary is being pursued. Establishment of physical standards for products not now provided with an official standard for the potency test has been started with research on a Reference Smallpox Vaccine.

III. Proposed Projects:

Continuation of projects already in progress.

IV. Projects in Progress:

(a) Standardization of a Smallpox Vaccine for use as an official standard in collaboration with Mr. R. W. Kolb.

(b) Development of a Reference Diphtheria Toxoid for use in the potency test for the fluid Tetanus and Diphtheria Toxoids Combined (For Adult Use) in collaboration with Mr. R. W. Kolb.

(c) Development of a dried Control Diphtheria Toxin.

(d) Development of a dried Control Botulinus Toxin.

(e) Improvement of the stability of Reference Rabies Vaccine.

Part B included Yes /___/ No /X/

Serial No. DBS 6
1. Bacterial Products
2. Bacterial Vaccines
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Pertussis Vaccine

Principal Investigator: Dr. Margaret Pittman

Other Investigators: Mrs. Claire B. Cox, Mr. Howard J. Bohner

Cooperating Units: None

Man Years:

Total:	2.5
Professional:	1.2
Other:	1.3

Project Description:

Objectives: The objective is that all lots of products containing pertussis vaccine issued by U. S. licensed establishments have optimum properties: adequate and stable potency throughout the dating period and relative freedom from untoward reactive substances.

Methods Employed: 1. The potency and toxicity of the pertussis vaccine component of all lots of products containing this antigen are kept under surveillance by testing the majority of lots submitted for release (about 200 per year) for potency and freedom-from-toxicity and all inspection samples for potency, by reviewing protocols and license applications and by conferences with technical representatives from manufacturers.

2. Investigation on the stability of the potency of pertussis vaccine component of quadruple antigen vaccine.

3. Special study on the adequacy of the revised potency and dating period for pertussis vaccine in quadruple antigen vaccine.

4. Analysis of results of toxicity tests performed during a 5 year period and revision of requirements, and a brief study on relation of mouse toxicity and reactions in children.

Major Findings: (1) In general, lots of single or triple antigen vaccines have remained satisfactory in potency, stability and toxicity. (2) Potency of pertussis vaccine in quadruple antigen vaccine containing poliomyelitis vaccine was found to be unstable; rate of loss calculated from combined data was 6 percent per month. (3) The strain of mouse used to test potency of pertussis vaccine in quadruple antigen vaccine may materially affect the estimate of potency.

Significance to bio-medical research and the program of the Division: The surveillance of and research on pertussis vaccine provides information relating to control and improvement of the product and basic scientific information about immunological and reactive properties of Bordetella pertussis.

Proposed Course of Project: The investigation on instability of pertussis vaccine in quadruple antigen vaccine has been completed and the results have been written up for publication. The other parts will be continued as outlined above.

Part B included Yes / / No /X/

Serial No. DBS 7
1. Bacterial Products
2. Bacterial Vaccines
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Typhoid Vaccine

Principal Investigator: Dr. Margaret Pittman

Other Investigator: Mr. Howard Bohner

Cooperating Units: Expert Committee on Biological Standardization, World Health Organization

Man Years:

Total:	0.8
Professional:	0.5
Other:	0.3

Project Description:

Objectives: To evaluate laboratory methods of assays of typhoid vaccine with the view to finding one which correlates with protective activity in man.

Methods Employed: WHO is carrying out field trials on two large lots of typhoid vaccine and cooperating laboratories are testing the vaccines, by methods outlined by WHO, for mouse protective activity and H, O and Vi antigenicity. Potency is also being measured by the U. S. required test.

Major Findings: With the use of the in vivo and in vitro methods prescribed by WHO, no significant differences between the activities of the two lots were found. With the U. S. test a significant difference in protective activity was found. By each method the U. S. reference typhoid vaccine was significantly lower in potency than the two experimental lots.

Significance to bio-medical research and the program of the Division: The finding of a laboratory assay of potency of typhoid vaccine which is correlated with activity in man would be very valuable in establishing meaningful potency standards for typhoid vaccine. Since the U. S. reference vaccine has been included in our project, it will be

possible to indirectly relate its laboratory measured activity with the field trial results. This should provide a basis of reference for the potency requirement for this vaccine.

Proposed Course of Project: The results of the tests carried out by the WHO methods have been submitted to WHO for compilation with results obtained in other laboratories. Results by U. S. methods are being compiled for forwarding to WHO. The project will be written up for reference for the Division in the control of typhoid vaccine.

Part B included Yes /__/ No /X/

Serial No. DBS 8
1. Bacterial Products
2. Bacterial Vaccines
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Investigations Concerning Sterility Testing

Principal Investigator: Dr. Margaret Pittman

Other Investigators: Dr. John C. Feeley, Mrs. Claire B. Cox

Cooperating Units: None

Man Years:

Total:	0.9
Professional:	0.7
Other:	0.2

Project Description:

Objectives: The recent inclusion of a specific sterility test for fungi in Regulations revealed a lack of published data on which to base definitive procedures. The objectives of this study are to reevaluate the procedures presently specified for the sterility test of biological products with a view to improving the test, not only by providing optimum conditions for the detection of the presence of contaminating bacteria, fungi and yeasts but also by simplifying the procedures. Emphasis is placed on influence of media, temperature and preservatives with particular reference to fungi and yeast.

Methods Employed: Using in general methods for sterility testings, experiments are designed to observe the influence of media, temperature, time, preservative and interrelation of these factors on the detection of the presence of minimal number of spores of a variety of fungi and yeasts as well as bacteria. The effect of neutralizing substances on preservatives is included.

Major Findings: (1) Effect of media and temperature. Malt Extract Agar incubated at 22° C yielded the highest percentage of recovery of fungi and yeasts, hence it was superior to the officially required Fluid Sabouraud Medium for the growth of these microorganisms not previously subjected to preservatives. With incubation at 22° C

for 3 days followed by incubation at 30° C, development in Fluid Thioglycollate Medium approached that in three media recommended for promotion of growth of fungi, but 21 days was required for maximum recovery.

(2) Influence of preservatives. (a) Not less than 21 days of incubation were required for maximum recovery of fungi and yeasts which had been subjected to insult by Merthiolate. (b) When Merthiolate was present Fluid Thioglycollate Medium was slightly superior to Fluid Sabouraud Medium with or without added sodium thioglycollate at 22° C. (c) With Fluid Sabouraud Medium it was necessary to dilute Merthiolate to a final concentration of 1:7,000,000 to enable all strains of fungi tested to initiate growth at 22° C. Results of early studies suggest that Merthiolate in concentrations used in biologics is fungicidal. If substantiated by further tests, sterility testing for detection of fungi may not be indicated for those products containing Merthiolate.

Significance to bio-medical research and the program of the Division: This project is of particular significance to the Division in relation to control of the safety and purity of biological products. It is essential that the products be free of contaminating bacteria, fungi and yeasts throughout manufacture. The aim of the present study is to provide ways for improving the procedures for detection of the presence of fungi and yeasts as well as bacteria and at the same time simplify the testing procedure.

Proposed Course of Project: Further studies on the anti-microbial activity of various preservatives and means of neutralizing these are contemplated. Studies on the effect of temperature on bacterial growth are continuing.

Part B included Yes /X/ No /___/

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B: Honors, Awards, and Publications

Publications other than abstracts from this project:

Pittman, M., and Feeley, J. C.: "Sterility testing: Detection of fungal and yeast contamination in biological preparations." Proceedings of the 7th International Congress of Biological Standardization. In Press.

Serial No. DBS 9
1. Bacterial Products
2. Bacterial Vaccines
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Studies on Cholera Vaccine

Principal Investigator: Dr. John C. Feeley

Other Investigator: Dr. Margaret Pittman

Cooperating Units: None

Man Years:

Total:	1.0
Professional:	0.5
Other:	0.5

Project Description:

Objectives: The objectives of this program are the investigation of methods for assaying the potency of cholera vaccine and establishment of an improved U. S. Standard of Potency for this product.

Methods Employed: 1) The recently developed mouse protection test which expresses potency relative to a reference vaccine has been employed to accomplish the following:

a) Standardization of freeze-dried monotype Ogawa and Inaba reference vaccines.

b) Assay of potency of vaccines prepared by licensed manufacturers as a preliminary step in establishing requirements for potency.

c) Evaluation of protective activity of U. S. vaccines against El Tor vibrios from the recent Hong Kong outbreak.

2) An alternative method for assaying the potency of cholera vaccine in terms of the immune response of guinea pigs measured as agglutinating and bactericidal activity is currently under investigation.

3) Efforts are being made to determine nitrogen content of cholera vaccines to establish acceptable limits for this parameter.

Major Findings: The early problem of loss of potency during freeze-drying has been largely overcome and freeze-dried ampules of Ogawa and Inaba vaccines have been prepared. Assay of these materials indicates that the Ogawa vaccine has retained approximately 75 percent, and the Inaba approximately 50 percent, of the potency of the undried product.

Studies completed to date on cholera vaccines from licensed manufacturers have revealed wide variation in potency. Potency values for the Inaba type ranged from 0.24 to 15.6 times the Inaba reference and 0.15 to 7.6 times the Ogawa reference. Further studies on additional lots are in progress.

Studies on the nitrogen content of cholera vaccine are not complete at this time.

Studies on the protective activity of U. S. vaccines against challenge with an El Tor Ogawa strain from Hong Kong revealed that these vaccines apparently protected mice against this strain at least as well as against the standard Ogawa challenge strain of "true" V. comma currently used in this Laboratory.

Preliminary findings indicate that a dose response relationship between antigenic stimulus and development of bactericidal antibodies in the guinea pig may be potentially useful in assay of cholera vaccine. Bactericidal antibody, but not necessarily agglutinating antibody, can be related to passive protective activity in mice. Immune sera with agglutinating activity almost invariably have high bactericidal activity, but the converse is not necessarily true. Furthermore, bactericidal antibody titrations with unabsorbed Ogawa and Inaba immune sera show the same cross-reactivity trend noted in protection tests, namely that Inaba vaccine elicits antibodies with greater cross-protective reactivity than the Ogawa vaccine. Agglutination tests on such unabsorbed sera generally reveal complete cross-agglutination between Ogawa and Inaba antigens.

Significance to bio-medical research and the program of the Division: Application of the quantitative mouse protection test to the assay of cholera vaccine should allow establishment of more adequate NIH potency requirements for this product. The possibility of using the bactericidal antibody response of the guinea pig for the assay of cholera vaccine may prove particularly important in various laboratories in the world lacking satisfactory mouse colonies. Well controlled data are still lacking on the efficacy of cholera vaccine in protection of man. Only when laboratory and field data have been correlated can a truly meaningful standard of potency be adopted.

Establishment of nitrogen content limits on cholera vaccine may aid in controlling untoward reactions. This aspect of the work is being related to adjustment of the amount of antigen present, the latter problem being particularly troublesome with this product due to the pronounced tendency of vibrios to undergo lysis in the presence of phenol preservative.

Proposed Course of Project: To carry through as indicated above, and in addition to acquire further information on methods of preparation of vaccine and use of different antigenic strains in relation to stability and potency.

Part B included Yes / / No /X/

Serial No. DBS 10
1. Bacterial Products
2. Bacterial Vaccines
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Bacteriological field investigation of epidemic choleriform enteritis (El Tor) in the Philippines.

Principal Investigator: Dr. John C. Feeley

Other Investigator: None

Cooperating Units: NIH Cholera Advisory Committee
Jefferson Medical College of Philadelphia

Man Years:

Total:	0.15
Professional:	0.15
Other:	0.0

Project Description:

Objectives: At the request of the Secretary of Health of the Philippines during the recent outbreak of "choleriform enteritis" caused by the El Tor Vibrio, a bacteriological field investigation of the disease was carried out in Manila in cooperation with Dr. Harry L. Smith, Jr. of the Jefferson Medical College of Philadelphia. Immediate objectives of the project were: 1) demonstration to local personnel of improved bacteriologic methods previously tested in Bangkok (1959) and Dacca (1960); 2) to make available and demonstrate the use of carefully standardized diagnostic antisera prepared by Dr. K. Goodner of the Jefferson Medical College; 3) to test a new potassium tellurite transport medium for field specimens devised by Dr. K. A. Monsur of the Pakistan-SEATO Cholera Research Laboratory; 4) to obtain cultures of the organism for further study; and 5) to obtain sera from patients and normal individuals for serologic investigation.

Methods Employed: Routine bacteriological procedures were employed utilizing direct plating of specimens on bile salt gelatin agar medium for isolation of the organisms. Serologic typing was performed by the slide agglutination technique using Jefferson Medical College antisera.

Major Findings: Cooperative studies with Filipino bacteriologists were carried out, during which the latter were instructed in the isolation and identification of vibrio cultures. Substitution of the gelatin-agar procedure for that previously employed in one particular laboratory resulted in approximately a 300 percent increase in isolation of positive cultures from specimens submitted.

This experience provided opportunity for field evaluation of freeze-dried diagnostic antisera. These antisera were employed by us and by Filipino workers in slide agglutination tests and revealed all agglutinable cultures isolated to be of the Ogawa type.

Studies by Philippine public health laboratories have indicated that the causative organisms of the current outbreak are of the Ogawa type, belong to Heiberg fermentation group I, and are hemolytic for sheep and/or goat erythrocytes. Accordingly, the organisms are considered to be of the "El Tor" type and the disease, although clinically identical to cholera, has been termed "choleriform enteritis" to distinguish it from classic cholera. In all, a total of 529 cultures were returned to the U. S. for more detailed study of serologic, biochemical, and hemolytic properties in order to confirm results obtained locally. These studies have not been completed.

A total of 222 sera from normal individuals and patients were acquired and returned to the U. S. for serologic studies. Results are not yet available.

Findings regarding the value of the new tellurite transport medium are not yet available.

Significance to bio-medical research and the program of the Division: Cholera has not been recognized in the Philippines since 1937. Activity of a cholera-like disease in the Western Pacific increased materially this year with outbreaks in Sarawak, Hong Kong, and Macao. Of particular interest is the fact that these epidemics appear due to El Tor Vibrios, which although showing minor differences (possession of a soluble hemolysin for sheep or goat erythrocytes) from classic Vibrio comma, have not previously been regarded as a significant cause of epidemic disease except perhaps in the Celebes where smaller outbreaks have occurred. Very significant implications may arise here in that "choleriform enteritis" caused by El Tor Vibrio, in contrast to cholera, is not considered as a quarantinable disease under current WHO International Sanitary Agreements. In view of this situation and technical difficulties involved in differentiation of El Tor Vibrios, a thorough study of these organisms and confirmation of their identification is clearly indicated. It may prove of particular interest to DBS to learn if current U. S. vaccines offer protection against these strains.

Proposed Course of Project: To carry out bacteriological investigations of representative cultures from the above collection and to perform serologic tests with paired sera to determine the serologic response to infection, and if possible, the effects of prior immunization on such response.

Part B included Yes / / No /X/

Serial No. DBS 11
1. Bacterial Products
2. Bacterial Vaccines
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Models of Experimental Infection with Vibrio comma

Principal Investigator: Dr. John C. Feeley

Other Investigator: None

Cooperating Units: None

Man Years:

Total:	0.4
Professional:	0.2
Other:	0.2

Project Description:

Objectives: Enteric infections of guinea pigs, both fatal and asymptomatic, have been produced with Shigella strains and Vibrio comma by others, who employed a variety of techniques. An asymptomatic enteric infection of mice has been produced by others with Shigella by infection of streptomycin-treated animals with streptomycin-resistant cultures. The present work was initiated to study such an enteric infection in mice with streptomycin resistant V. comma, hoping that this system might be a useful model for studies of the disease.

Methods Employed: Enteric infections in mice were established by a modification of the method used by Freter with Shigella. This involved treatment with oral streptomycin to eliminate competing enteric flora and intragastric inoculation with streptomycin resistant V. comma. Infection was assayed by culture of fecal pellets. Antibody levels were determined by in vitro bactericidal tests on sera and fecal extracts.

Major Findings: Following suppression of the normal enteric flora with streptomycin, mice were readily infected orally with as few as 1-10 streptomycin-resistant cholera vibrios. Doses as

high as 100 billion failed to infect untreated mice. A chronic asymptomatic infection during which time 10^{10}-10^{12} organisms per fecal pellet were excreted could be maintained at least 8 weeks by continuous streptomycin treatment. The vibrios disappeared 5-7 days after discontinuing streptomycin treatment, and also when other streptomycin-resistant gram-negative enteric bacteria became establishe in the gut. Cage mate mice treated with streptomycin readily contracted the infection. Attempts to produce symptomatic infection by carbon tetrachloride treatment or starvation failed.

The establishment of enteric infection in mice was followed by a rising serum level of bactericidal antibody. Agglutinating antibody was not detected. Low levels of bactericidal copro-antibody have also been detected in feces of approximately 75 percent of animals reaching a maximum in 5-7 days and disappearing within 10-14 days. Appearance of copro-antibody did not result in elimination of the infection.

Preliminary immunization experiments have indicated that large parenteral doses of dead cholera vaccine may induce approximately a 10,000-fold increase in the dose required for infectivity. Oral administration of the same dose of dead or living vaccine failed to induce resistance to infection. Establishment of infection for 5-12 days also induced a similar relative resistance to later re-infection as measured by increase in the infecting dose of bacteria. Acquisition of increased resistance to infection did not appear related to presence of detectable copro-antibody.

Significance to bio-medical research and the program of the Division: Research on cholera has been greatly hindered by lack of a susceptible experimental animal in which a disease similar to human cholera can be produced. Infection of the streptomycin treated mouse by antibiotic resistant strains as presently employed does not replicate human cholera. It is conceivable that mice are naturally insusceptible to the physiologic insult of cholera. It is also possible that the cultures employed may have lost capability to produce disease. The use of freshly isolated cultures is presently not possible due to the necessity of inducing streptomycin resistance. Perhaps other experimental manipulations can be invoked to increase susceptibility to a disease process. The most interesting observation to date is the apparent development of some degree of resistance to infection following intense parenteral immunization or short term enteric infection.

Proposed Course of Project: It is hoped to attempt manipulations of the mouse system to produce overt disease perhaps by induction of nutritional deficiencies or use of pharmacologic factors. Further studies on the nature of the immune response are contemplated.

Part B included Yes / / No /X/

Serial No. DBS 12
1. Bacterial Products
2. Bacterial Vaccines
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Rapid Tests for Bacterial Identification

Principal Investigator: Dr. John C. Feeley

Other Investigator: None

Cooperating Units: None

Man Years:

Total:	0.4
Professional:	0.2
Other:	0.2

Project Description:

Objectives: In general, this project has as its objective the development and evaluation of rapid methods for bacterial identification with special reference to cholera vibrios and related organisms. Specif points covered this period are tests for rapid detection of gelatinase activity and methods for detection of hemolytic activity by the El Tor Vibrio.

Methods Employed: 1) Rapid detection of gelatin hydrolysis: Employing a variety of cultures, the classical gelatin stab was compared with the "filmstrip" method of Hoyt and coworkers and the gelatin-agar plate procedures described by McDade and Weaver and by Smith and Goodner

2) Detection of hemolytic activity by El Tor vibrios: A quantitative study of some of the more obvious variables in this procedure was initiated to define from a practical standpoint a reliable method for performance of the test.

Major Findings: 1) Gelatin hydrolysis: The filmstrip method was found to be the most rapid of all the methods tested, while offering reliable and clear-cut results. Positive gelatin liquefaction tests were obtained with rapidly hydrolytic cultures (e.g. V. comma) in as little as 10 minutes. With weakly active cultures such as the "Arizona Group" of enteric bacteria, which may require up to 35 days by the

gelatin stab, positive results were obtained in 48 hours or less, with the majority of reactions being detectable within 18 hours. Reactions on the plating media were slower than with the filmstrip. Each method was far more rapid and clear-cut than the classical stab technique.

2) Detection of hemolytic activity by the El Tor Vibrio: Results to date indicate that all the major experimental variables in the test (e.g. culture media; length of incubation of culture; source, age, and condition of erythrocytes; test concentration of cells; and conditions of incubation of the test) were potentially capable of playing a significant role in the outcome. "False negative" results may occur when certain media are employed. Cells from certain sheep have been found to be markedly less sensitive than others. The use of too great a concentratio of cells in the test can mask the presence of hemolytic activity. Studie of these and other factors are still in progress.

Significance to bio-medical research and the program of the Division: Rapid and reliable tests for recognition of properties of various bacteria are of importance, not only in speeding up a reliable bacteriologic diagnosis, but also because many of these methods are readily adaptable for field studies. The filmstrip gelatin hydrolysis procedure requires only a small strip of x-ray film and a suspension of bacteria.

Methods for detection of the hemolytic activity of vibrio cultures for differentiation of the so-called "El Tor" vibrio from "true" V. comma have assumed increased importance with the occurrence in epidemic form of "cholera" due to El Tor Vibrio in Sarawak, Hong Kong, Macao, and Manila. Previously, only smaller epidemics in the Celebes have occurred. This distinction assumes even more significance, because so-called "choleriform enteritis" due to El Tor vibrio is not currently listed as a quarantinable disease. It would seem possible to perform a reliable hemolytic test, but until standard conditions are more precisely defined, one cannot over-emphasize the need for including adequate positive and negative control cultures in any test series.

Proposed Course of Project: Experimental studies on gelatin liquefaction have been terminated, and a manuscript for publication is in preparation.

Studies on detection of hemolytic activity will be pursued to the point where concrete recommendations for practical performance of the test can be formulated.

Part B included Yes / / No /X/

Serial No. DBS 13
1. Bacterial Products
2. Allergenic Products
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Studies on the specificity of tuberculin

Principal Investigators: Dr. Harold Baer
Dr. Sotiros D. Chaparas

Other Investigators: Dr. C. W. Hiatt (LBB)
Dr. J. J. Helprin (LBB)
Mr. R. J. Benoit (LBB)

Cooperating Unit: Laboratory of Biophysics and Biochemistry

Man Years:

Total:	1.0
Professional:	0.9
Other:	0.1

Project Description:

Objectives: The purpose of this project is to ascertain whether it is possible to prepare a tuberculin with greater specificity than currentl available tuberculins and to study methods of measuring tuberculin hypersensitivity.

Methods Employed: Culture filtrates and bacterial autolysates of the BCG strain of Mycobacterium tuberculosis are being fractionated and analyzed chemically and immunochemically to determine whether some fractio of this complex material are more specific than others. Several mycobacterial strains will be used to sensitize guinea pigs in order to investigate the specificity of the tuberculin fractions.

Tuberculin hypersensitivity is being measured by the usual delayed reaction in the skin of sensitive guinea pigs. In another approach to this problem, lymph node cells from sensitized and normal guinea pigs were placed in a Warburg apparatus and oxygen uptake measured with and without the addition of tuberculin to the suspending medium.

Those tuberculin fractions that seem of interest are being further characterized in the analytic ultracentrifuge.

Major Findings: Many antigenic components have been found in the BCG culture filtrates and autolysates as well as in various commercially obtained PPD preparations. Many of the fractions prepared from these materials exhibit skin reactivity in sensitized guinea pigs, but it has not yet been possible to determine whether there is one skin reactive component that occurs in variable quantities in many fractions or whether there are several different skin reactive components. Some of the fractions have been subjected to ultracentrifugation and shown to have different sedimentation constants.

The attempt at inhibition of the metabolic activity of lymph node cells by tuberculin was not pursued since the preliminary experiments indicated that very large numbers of cells were required to obtain meaurable oxygen uptake. This approach may be re-examined in the future since cells harvested at different times following sensitization or employing substrates other than glucose may produce a more active system.

Significance to bio-medical research and the program of the Division: If one or more purified substances were obtained that produce the typical tuberculin reaction in appropriately sensitized animals, a more reliable, specific, and reproducible standard might become available.

Proposed Course of Project: To proceed as outlined above.

Part B included Yes / / No /X/

Serial No. DBS 14
1. Bacterial Products
2. Allergenic Products
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Standardization of poison ivy extract

Principal Investigator: Dr. Harold Baer

Other Investigator: Mr. Robert Bowser

Cooperating Units: None

Man Years:

Total:	1.7
Professional:	1.0
Other:	0.7

Project Description:

Objectives: (1) Investigate the feasibility of producing a standard of potency for poison ivy extract. (2) Study the immunology of poison ivy extract and one of its components, 3-pentadecylcatechol (PDC).

Methods Employed: Guinea pigs are made sensitive with PDC or poison ivy extract and then challenged by applying either of the above in acetone or alcohol solution to a circumscribed area of skin by means of a brass ring. Fresh poison ivy leaves were collected and an extract prepared in order to compare fresh extracts with commercially available extracts. Stability studies are being carried out with PDC and poison ivy extract in acetone, alcohol, and aqueous alcohol solutions.

The immunology of poison ivy and PDC sensitivity is being studied by parenteral and oral administration of the allergen and by passive transfer of the sensitivity.

Results: Guinea pigs sensitized to either PDC or poison ivy extract react to each when placed on the skin. It is possible to titrate this sensitivity in a reproducible fashion. Four commercially obtained poison ivy extract preparations failed to demonstrate activity when placed on the skin of sensitized guinea pigs. However, each of these 4 extracts when incorporated in Freund's adjuvant, were capable of sensitizing guinea pigs to PDC indicating that they possessed small amounts of poison ivy allergen.

It has been found possible to transfer the typical sensitivity by means of lymph node cells when using strain 13 guinea pigs.

Significance to bio-medical research and the program of the Division: If this project is successful, poison ivy extract will become the first allergenic product with a standard of potency.

Proposed Course of Project: To proceed as outlined above.

Part B included Yes / / No /X/

Serial No. DBS 15
1. Bacterial Products
2. Allergenic Products
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Studies on the serum proteins, skin reactivity and pathology of animals injected with Freund's adjuvants

Principal Investigators: Dr. Sotiros D. Chaparas
Dr. Harold Baer

Other Investigators: Dr. R. L. Kirschstein (LVI)
Dr. C. W. Hiatt (LBB)
Mr. R. J. Benoit (LBB)

Cooperating Units: Laboratory of Viral Immunology
Laboratory of Biophysics and Biochemistry

Man Years:

Total:	1.5
Professional:	0.7
Other:	0.8

Project Description:

Objectives: To determine the effects of complete and incomplete Freund's adjuvants in guinea pigs. To determine in animals sensitized with BCG the effects of repeated skin injections of PPD on: 1) serum proteins, 2) reactions at sensitization site, 3) skin reactivity, and 4) general pathology.

Methods Employed: Sensitization was accomplished by injection into the nuchal area of guinea pigs of a suspension of killed BCG emulsified in Arlacel-Atreol mixture. The Arlacel-Atreol mixture obtained commercially met unofficial specifications for experimental human use. A skin testing regime was set up in which certain groups of animals were tested weekly for a period of several months. Sera obtained prior to and at intervals following sensitization were studied for protein changes by means of paper electrophoresis, ultracentrifugation, and total nitrogen determination. The circulating antibodies produced were studied by a tanned cell agglutination procedure. Animals were examined at necropsy for pathological lesions and portions of selected organs were sectioned for histological examination.

Major Findings: 1. Serum protein changes: In animals receiving adjuvant + BCG, the gamma globulin component of the post-sensitization serum was elevated about three fold. An increase of about two fold was also noted in the beta globulins. A smaller rise in these two components was observed in animals receiving BCG without adjuvant. Animals receiving a single or 14 weekly injections of incomplete adjuvant, those not sensitized but skin tested weekly, and control animals showed no changes in serum components. Ultracentrifugal studies of sera showing the greatest changes displayed a large increase in a 6S component of a three component system. No differences in the amount of total nitrogen were observed between post- and pre-sensitization sera. Hemagglutination reactions using tanned red cells sensitized with tuberculoprotein antigen showed that circulating antibodies were produced but their titers did not correlate with increases in gamma globulin.

2. Reactions at injection sites: Large lumps (15 mm diameter or greater) developed within 2-3 weeks at the injection site of guinea pigs sensitized with BCG + adjuvant and skin tested weekly. Similarly treated animals which were not skin tested required 4-7 weeks before they developed reactions of this size. Animals receiving BCG alone in the nuchal region developed large lumps only when they were skin tested. Single or multiple injections of incomplete adjuvant alone in the necks of guinea pigs did not produce any extensive swelling or inflammation at these sites, whether the animals were skin tested or not. Macroscopic and microscopic histological findings were not different from those reported by other workers.

3. Skin reactivity: No significant differences in size and intensity of reactions to skin tests with PPD were noted in animals sensitized either with BCG or with BCG in combination with adjuvant. Once the maximum degree of sensitivity was achieved, weekly testing over a period of several months did not alter the size of the reaction to a given dose.

Significance to bio-medical research and the program of the Division: Because oil emulsions have been suggested as vehicles for the administration of many biological products, studies are being made to determine whether pathological processes arise and whether changes which may be due to the parenteral administration of the emulsions occur in serum proteins. Weekly skin tests with PPD produced reactions in the sites of injections in sensitized animals but did not affect the usefulness of the guinea pigs for weekly skin testing of PPD.

Proposed Course of Project: Long term examination of certain groups of animals is planned to determine whether the continuous presence of adjuvants will induce pathological lesions and changes in the serum constituents.

Part B included Yes / / No /X/

Serial No. DBS 16
1. Bacterial Products
2. Bacterial Toxins
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: The Schick Test Toxin (Diphtheria)

Principal Investigator: Dr. Michael F. Barile

Other Investigators: Mr. Donald B. Riggs
Mr. Robert W. Kolb (LCA)

Cooperating Unit: Laboratory of Control Activities, DBS

Man Years:

Total:	1.3
Professional:	0.6
Other:	0.7

Project Description:

Objectives: A. 1. To establish the potency, avidity and thermal stability of the dried U. S. Standard Diphtheria Toxin and compare it with the International Standard. 2. To develop a more accurate potency assay test. B. To consider revision of standards for Diphtheria Toxin for the Schick Test.

Methods Employed: Potency of diphtheria toxin was determined by skin reactions (MRD) and lethal response (MLD). Avidity of the toxins was determined by information obtained on antitoxin combining reactions (Lr and L+) done at different concentrations and periods of reaction.

Major Findings: When the dried U. S. Standard Toxin preparation was compared to the parent liquid toxin, no loss of potency or avidity was detectable. Accelerated stability studies carried out on the reconstituted dried toxin preparation showed no detectable loss in potency after heat exposure of 37°C for 24 hours. The Schick Test dose of toxin defined for the U. S. Standard Diphtheria Toxin is comparable to that of the International unit. Each ampoule of the International Standard contains 900 Schick Test doses. Each vial of dried U. S. preparation contained 35 MLD, 43 LD50, 33,333 MRD and 1050 Schick Test doses of toxin.

A potency test for assay of diphtheria toxin for the Schick Test based on an erythema skin reaction in the guinea pig in comparison with the U. S. Standard Toxin has been developed. The test is practical and results are reproducible.

Significance to bio-medical research and the program of the Division: The present study will provide background information for the re-evaluation of the present requirements and to consider revision of standards for Diphtheria Toxin for the Schick Test.

Proposed Course of Project: The following documents are being prepared and will be submitted for DBS consideration: 1) a report of studies made, 2) the preparation and standardization of a potency assay incorporating the Standard Diphtheria Toxin for the Schick Test, and 3) a draft of Additional Standards: Diphtheria Toxin for the Schick Test.

Part B included: Yes / / No /X/

Serial No. DBS 17
1. Bacterial Products
2. Bacterial Toxins
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Pleuropneumonia-like Organisms from Tissue Cultures

Principal Investigator: Dr. Michael F. Barile

Other Investigators: Mr. Donald Riggs
Dr. Casper Hiatt (LBB)
Major Walter F. Malizia (AFIP)

Cooperating Units: Laboratory of Biophysics and Biochemistry
Armed Forces Institute of Pathology

Man Years:
Total: 0.6
Professional: 0.3
Other: 0.3

Project Description:

Objectives: To develop methods for detection and elimination of PPLO and/or L forms of bacteria from tissue culture lines by means of (a) in vitro cultivation of PPLO forms and fluorescent antibody methods and (b) the photoinactivation procedure. To advise other Institutes on problems pertaining to PPLO when indicated.

Methods Employed: (a) The fluorescent antibody technique was used to determine the antigenic structure of PPLO isolated from tissue culture. Specificity of the fluorescent antibody reaction was examined by testing it with human PPLO strains and various bacterial species. A survey of tissue culture cells for PPLO made by the fluorescent antibody technique was compared with cultural procedures. (b) The photoinactivation procedure was used to determine the effect on the viability of PPLO strains in suspension and in contaminated tissue culture cells.

Major Findings: (a) 1. Detection of PPLO in cell cultures by the fluorescent antibody technique compared favorably to cultural procedures; 49 out of 102 cell cultures examined were contaminated with PPLO; 72% of the cells grown in media containing antibiotics were contaminated with PPLO whereas only 7% of the cells grown in antibiotic-free media were

contaminated. Tissue culture PPLO strains were antigenically related and may comprise a serologic group. 2. For cultivation and isolation, tissue culture PPLO strains are best grown under anaerobic conditions and prefer human and horse sera to rabbit or sheep sera. For identification, the method of cultivating PPLO on membrane disc for microscopic examination has proved useful.

(b) Preliminary findings indicate that tissue culture PPLO strains are very sensitive to the effects of photoinactivation.

Significance to bio-medical research and the program of the Division: In view of the requirements for determining the presence of PPLO in products, such as measles vaccine, these studies will provide information for establishing standards for these products.

Proposed Course of Project: (a) Prepare for publication studies on 1) the use of the fluorescent antibody technic for detection of PPLO in cell culture and 2) the media components and optimal condition required for the cultivation of PPLO.

(b) Examine the use of photoinactivation as a means of eliminating PPLO from contaminated cell cultures.

Part B included Yes /X/ No / /

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B: Honors, Awards, and Publications

Publications other than abstracts from this project:

1. Malizia, Walter F., Barile, Michael F., and Riggs, Donald B. Immunofluorescence of Pleuropneumonia-like Organisms Isolated from Tissue Cell Culture. Nature 191: 190-191, 1961. (Listed in 1960 Report as in press.)

2. Barile, Michael F. Detection and Elimination of Contaminating Organisms. Journal of the National Cancer Institute, Monograph Series No. 7. (In press)

3. Barile, Michael F. Cultivation of Pleuropneumonia-like Organisms on Membrane Disc for Microscopic Examination. J. Bacteriol. (In press)

Serial No. DBS 18
1. Bacterial Products
2. Bacterial Toxins
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Investigation of tetanus toxoids for prevention of neonatorum tetanus

Principal Investigator: Dr. Michael F. Barile

Other Investigator: Dr. Margaret Pittman

Cooperating Units: Department of Public Health
Territory of Papua and New Guinea

Man Years:
Total: 0.1
Professional: 0.1
Other: 0.0

Project Description:

Objectives: Neonatorum tetanus is an important cause of infant mortality in a number of areas in the world. Prevention by means of vaccination of pregnant women is under investigation in New Guinea. The objective of the LBP project is to titrate (1) the potency of four experimental tetanus toxoid preparations and (2) the immune response of representative samples from the vaccinated subjects.

Methods Employed: Methods to be employed will be selected after evaluation of preliminary in vitro and in vivo immunological methods for titration of tetanus toxoids and antitoxin.

Major Findings: None. Investigation is in the initial stage.

Significance to bio-medical research and the program of the Division: Information will be obtained concerning the relative value of various quantitative methods of titrating tetanus toxoids and antitoxin which might be applicable to the improvement of the present official tests.

Proposed Course of the Project: To proceed as outlined above.

Part B included Yes / / No /X/

Serial No. DBS 19
1. Viral Immunology
2. Section on Pathology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Neurovirulence Tests on Live Poliovirus Vaccines in Monkeys.

Principal Investigator: Dr. Ruth L. Kirschstein

Other Investigators : Dr. Gerald S. Forman

Cooperating Units : Serology Section screens monkey serums for freedom from antibody to poliovirus

Man Years:

Total	:	11.0
Professional	:	1.0
Other	:	10.0

Project Description:

Objectives: To test Live Poliovirus vaccines for ability to induce poliomyelitis in rhesus monkeys when inoculated directly into the central nervous system.

Methods Employed: Monkeys are inoculated with vaccine or dilutions thereof either intraspinally or intrathalamically, and observed for evidence of developing paralysis over a period of 17-18 days. The monkeys are then sacrificed and the central nervous system examined histologically for evidence of poliomyelitis. In addition tissues are saved for virus isolation attempts. This testing is performed as outlined by the PHS regulations for the Live Poliovirus Vaccines and test results are compared with similar results obtained with the reference vaccine preparation.

Major Findings: The Reference Vaccine has been tested on nine separate occasions during 1961 and certain standards have thus been set. A total of 42 vaccine lots have been tested, the testing at present being performed on all of the vaccines submitted. In addition, certain seed virus lots have been tested. A total of 2730 monkeys have been used in this testing.

On the basis of the findings of these tests, Types I and II Live Poliovirus Vaccine, oral have been licensed by the Government.

Tests on other Type I, II, and III vaccines are under way.

Significance to the Program of the Division: Integral part of the DBS program of control of Poliovirus Vaccine, Live, Oral.

Proposed Course: This endeavor will continue in 1962 on the same scale.

Part B included yes / / no / X /

Serial no. DBS 20
1. Viral Immunology
2. Section on Pathology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Monkey Safety Test for Poliomyelitis Vaccine and Adenovirus Vaccine.

Principal Investigator: Dr. Ruth L. Kirschstein

Other Investigators : Dr. Gerald S. Borman

Cooperating Units : Serology Section screens monkey serums for freedom from antibody to poliovirus

Man Years:

Total	:	4.5
Professional	:	0.5
Other	:	4.0

Project Description:

Objectives: To test poliomyelitis and adenovirus vaccines for the presence of residual active virus particles that can only be detected by the direct inoculation of monkeys.

Methods Employed: As outlined by the PHS regulations for the above vaccines.

Major Findings: During 1961, 8 of 83 poliomyelitis vaccines and 2 of 6 adenovirus vaccines was tested for safety in monkeys. The central nervous system of 140 monkeys were examined grossly and microscopically. No histologic lesions were found in any monkeys.

Significance to the Program of the Division: Integral part of the DBS program.

Proposed Course: This endeavor will continue in 1962 on the same scale.

Part B included yes / X / no /___/

Part B

Honors, Awards and Publications

1. Kirschstein, R. L., Van Hoosier, G. L., and Li, C. P., Virus B Infection of the Central Nervous System of Monkeys Used for the Poliomyelitis Vaccine Safety Test, American Journal of Pathology 38:119-124 (1961).

2. Van Hoosier, G. L., Kirschstein, R. L., Abinanti, F. R., Hottle, G. A., and Baron, S., The Safety Test for Poliomyelitis Vaccine I. An Evaluation of Variable Factors in the Monkey and Cell Culture Systems, Am. J. Hygiene 74:209-219 (1961).

Baron, S., Kirschstein, R. L., Van Hoosier, G. L., Abinanti, F. R., and Hottle, G. A., The Safety Test for Poliomyelitis II. The Concentrates of Poliomyelitis Vaccine for the Monkey Test, Am. J. of Hygiene 74:220-224, (1961).

Ser. No. DBS 21
1. Viral Immunology
2. Section on Pathology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : The Pathogenesis of Infectious Diseases

Principal Investigator: Dr. Ruth L. Kirschstein

Other Investigators : Dr. Alan Rabson, NCI
Dr. Gerald Borman
Dr. Lawrence Kilham
Dr. Teresa Mercado, NIAID
Dr. Bernice Eddy
Dr. Robert Friedman
Dr. Paul Gerber
Dr. Harold Baer
Dr. C. P. Li

Cooperating Units : Laboratory of Virology and Rickettsiology, DBS
Laboratory of Bacterial Products, DBS
Laboratory of Parasite Diseases, NIAID
Pathologic Anatomy Branch, NCI

Man Years:

Total	:	1.0
Professional	:	0.5
Other	:	0.5

Project Description:

Objectives: To study the pathogenesis of various experimental infectious diseases.

Methods Employed: Gross autopsies and histologic examinations were carried out on infected animals.

Major Findings:

1. (With Dr. Rabson). The pathology of the intracranial sarcomas produced in hamsters by the polyoma virus has been studied in detail. The pathogenesis of these lesions is being studied in detail at the present time.

2. (With Drs. Kilham and Rabson). Studies on a naturally occurring rat virus and its effect when inoculated in Mastomys have shown that infection with production of inclusion bodies does occur in these animals.

3. (With Drs. Kilham and Mercado). A strain of malaria which infects rats has suddenly developed the capacity to cause paralysis with hemorrhagic lesions in the spinal cords and brains. The pathogenesis and etiology of this phenomenon are under study.

4. (With Dr. Robert Friedman).

(a) Studies of the genetic and neurovirulence characteristics of the Sabin Type I live poliovirus vaccine after gastrointestinal passage have indicated that the virus is excreted for prolonged periods of time (up to 120 days) and that, at least, in some individuals, there is a change of the neurovirulence characteristics toward increased virulence. However, the temperature marker, (said to correlate with neurovirulence) did not always show changes.

(b) Studies of wild poliovirus strains isolated from paralytic cases reveal that all these viruses are quite virulent for the monkey even though the temperature marker varies considerably.

5. (With Dr. Gerber). Studies of the oncogenic properties of a new simian virus (SV40) reveal that subcutaneous inoculation into newborn hamsters gives rise to subcutaneous fibrosarcomas whereas intracerebral inoculation gives rise to true gliomas of the brain.

6. (With Dr. Baer). Studies of the histologic changes induced by complete and incomplete Freund's adjuvant in guinea pigs and monkeys are in progress.

7. (With Drs. Borman and Van Hoosier). Studies of the neurovirulence of various enteric viruses are in progress.

8. (Drs. Borman and Eddy). The subcutaneous sarcomas induced in newborn hamsters by inoculation of monkey kidney cell extracts have been produced also by inoculation of SV40.

9. (Drs. Borman and Li). The pathogenesis of polyoma virus--induced hydrocephalus in Swiss mice is under study.

Part B included yes / X / no / /

Part B

Honors, Awards, and Publications

1. Rabson, A. S., Kilham, L., and Kirschstein, R. L. Intramuscular Inclusions in Mastomys Inoculated with Rat Virus, J. Nat. Cancer Institute (in press).

2. Kirschstein, R. L., and Gerber, P., Ependymomas produced after intracerebral inoculation of SV40 into newborn hamsters (submitted to Nature, London for publication).

3. Eddy, B. E., Borman, G. S., Grubbs, G. E., and Young, R. D., Induction of Tumors in Hamsters by Infection of Simian Virus 40, (Virology in press).

PHS-NIH
Individual Project Report
Calendar Year L961

Part A

Project Title : The Tissue Culture Preparation and Tissue Culture Testing of Killed Virus Vaccines.

Principal Investigator : Dr. Paul Gerber

Other Investigators : Mr. Robert Grubbs

Cooperating Units : Monkey and rabbit tissues provided by the monkey safety testing unit.

Man Years :

Total	:	6.5
Professional	:	0.5
Other	:	6.0

Project Description:

Objectives: To prepare primary and continuous cell cultures for research and test purposes and to test vaccines for safety by tissue culture methods.

Methods Employed: The methods are those outlined in the PHS Regulations and in the scientific literature.

Major Findings: (1) During this year samples of 60 lots of poliomyelitis vaccine (7 manufacturers) and of 19 lots of adenovirus vaccine (3 manufacturers) were tested for safety in tissue culture. Simian Virus 40 (SV40) was found in 13 of 51 lots of poliomyelitis virus vaccine and in 13 of 17 lots of adenovirus vaccine tested. (2) During the past year the following cell cultures were prepared:

(a) Primary Cell Cultures. (see attached)
(b) Stable Cell Cultures. (see attached)

Significance to the Program of the Division: Integral part of DBS testing program.

Proposed Course: This is a continuing project.

Part B included Yes /___/ No /_X_/

Annual
Primary Culture Production

Annual Report for: November 1, 1960 - October 31, 1961

Culture Productions:

Type of Culture	Tubes	Bottles 2 oz.	Bottles MDB*	Bottles 32 oz.
Monkey Kidney - Rhesus	87,675	34,229	3,584	2,704
Monkey Kidney - Vervet	67,494	1,290	1,098	582
Rabbit Kidney	5,722	5,319	65	156
Guinea Pig Kidney	120	1,564	4	139
Cat Kidney	25	--	106	58
Chick Embryo	1,475	19,255	--	157
Rat Embryo	25	--	106	58
Mouse Embryo	50	--	108	85

* MDB - Milk Dilution Bottles

No. & Type Tissues Processed		Vol. Packed Cells	Prepared for Serology
Monkey Kidney Rhesus	1,042	2,517 cc	196 ml second generation
Monkey Kidney Vervet	123	382 cc	packed cells
Rabbit Kidney	427	311 cc	
Guinea Pig Kidney	343	102 cc	
Cat Kidney	6	20 cc	
*Chick Embryo	1,132	634 cc	
*Rat Embryo	402	31 cc	
Mouse Embryo	159	30 cc	

* Rat embryo lot #76 did not grow and with chick embryo lot #2 growth was not satisfactory for intended use.

Twenty-two individual pairs of kidneys (Rhesus) were processed for Dr. Meyer of L.V.R.

196 ml packed MK (Rhesus) cells were distributed among several investigators in Buildings #6 and 7.

Annual Report for November 1, 1961 - October 1961

Type of Culture	Tubes	2 oz.	MDB	32 oz.
HEP II	4,175	1,484	81	171
HeLa	7,050	294	280	228
Monkey Stable	3,3310	2,644	--	50
Human Amnion	5,195	80	15	190
C.A.T. (Chorian Amnion)	2,680	73	34	40
Monkey Heart	8,330	--	10	40
KB	4,635	--	100	64
L-Cells	--	70	--	8

245.7 liters of media were prepared

1527 - 32 oz culture stock bottles were prepared

Serial No. DBS 23
1. Viral Immunology
2. Section on Tissue Culture
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Studies on the Vacuolating Agent (SV_{40})

Prinicpal Investigator : Dr. Paul Gerber

Other Investigators : Dr. Casper Hiatt and Dr. Ruth L. Kirschstein

Cooperating Units : Laboratory of Biophysics and Biochemistry, and Section of Pathology, LVI.

Man Years :

Total	:	0.7
Professional	:	0.4
Other	:	0.3

Sub-project A: Inactivation of Vacuolating Virus by Formaldehyde.

Objectives: To study the characteristics of the inactivation curve and to detect residual SV_{40} in viral vaccines.

Methods Employed: Vacuolating virus was treated with 1:4000 Formalin for varying periods of time up to 14 days. The surviving fraction was determined by infectivity assay in Cercopithecus monkey kidney cell cultures. Samples of killed virus vaccines were tested for residual SV_{40} by tissue culture methods.

Major Findings: (1) The inactivation of SV_{40} with 1:4000 formalin followed a biphasic curve with a levelling off after about 40 hours leaving a surviving fraction of virus which was resistant to further inactivation for the remainder of the 14 day period. (2) Viable SV_{40} was detected in some commercial lots of formalinized poliomyelitis and adenovirus vaccines.

Significance to the Program of the Division: This work has provided basic information on the biological properties of SV_{40} and on the detection of this virus in commercial lots of killed virus vaccines.

Proposed Course: This project is continuing as a part of the control program of this division.

Sub-project B: An Infectious Deoxyribonucleic Acid Derived From Vacuolating Virus (SV_{40}).

Objectives: To determine the biochemical characteristics of SV_{40}.

Methods Employed: A concentrated pool of SV_{40} was prepared by ultracentrifugation. The nucleic acid was extracted with phenol. Its infectivity was assayed on cultures of Cercopithecus monkey kidney cells.

Major Findings: The infectivity of the nucleic acid was destroyed by DNAase treatment but remained unaffected when exposed to the action of RNAase or specific antiserum.

Significance to the Program of the Division: Information obtained has added to basic knowledge regarding the properties of SV_{40}.

Proposed Course: Project has been completed.

Sub-project C: Photodynamic Inactivation of the Vacuolating Virus (SV_{40})

Objectives: Differential inactivation of SV_{40} in suspensions of poliovirus.

Methods Employed: The course of photodynamic inactivation of SV40 itself and in combination with poliovirus was determined using a continuous flow apparatus developed by Dr. Hiatt.

Major Findings: At a flow rate of 150 ml/minute the infectivity of SV_{40} was reduced approximately 5 logarithmic units without any significant effect on the infectivity of poliovirus.

Significance to the Program of the Division: The results obtained may lead to a practical application in the preparation of live, attenuated viral vaccines.

Proposed Course: The study has been completed.

Part B included Yes / X / No / /

PHS-NIH
Individual Project Report
Calendar Year 1960

Part B: Honors, Awards and Publications.

Publications other than abstracts from this project:

1. Van Hoosier, Jr., Gerald L.,Kirschstein, Ruth L., Abinanti, Francis R., Hottle, George A., and Baron, Samuel. The Safety Test for Poliomyelitis Vaccine. I. An Evaluation of Variable Factors in the Monkey and Cell Culture Systems. Am. J. Hyg. 74: 209-219, 1961

2. Baron, Samuel, Kirschstein, Ruth L., Van Hoosier, Jr., Gerald L., Abinanti, Francis R., and Hottle, George A. The Safety Test for Poliomyelitis Vaccine. II. Concentrate of Poliomyelitis Vaccine for the Monkey Test. Am. J. Hyg. 74: 220-224, 1961

3. Van Hoosier, Jr., Gerald L., and Melnick, Joseph L. Neutralizing Antibodies in Human Sera to Herpevirus Simiae (B Virus). Tex. Rep. Biol. and Med. 19: 376-380, 1961

* Publications on work done in past and part A submitted in previous annual reports.

Serial No. DBS 24
1. Viral Immunology
2. Section on Animal Test
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Studies on the Mechanisms of Recovery from Viral Infections and the role of Interferon.

Principal Investigator : Dr. Robert Steinmuller

Other Investigators : Drs. S. Baron, R. Friedman, Mr. C. Buckler

Man Years :

Total : 0.5
Professional :
Other :

Project Description:

Objectives: To elucidate the factors responsible for resistance to and recovery from viral infections.

Methods Employed: Animal immunization; suppression of the immune response by radiation or chemotherapy; viral cultures and assay in tissue culture and egg systems; production and assay of interferon in various in vivo and in vitro systems.

Major Findings: In recently published work by Baron, Friedman and Buckler, recovery from vaccinia infection has been demonstrated in the presence of complete suppression of specific immunity and hypersensitivity in Guinea Pigs.

Significance to the Program of the Division: Study of possible mechanisms for resistance of animals to virus infection.

Proposed Course: To study the effect of virus infection on interferon production.

Part B included yes / / no /X/

Serial No. DBS 25
1. Viral Immunology
2. Section on Serology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Standardization of Immune Serum Globulin (Human) for antibodies to the three types of poliovirus by the metabolic inhibition test. (MIT)

Principal Investigator: Dr. B. William Uhlendorf

Other Investigators : Mr. Robert W. Kolb (LCA)

Cooperating Units : None

Man Years:

Total	:	0.3
Professional	:	0.1
Other	:	0.2

Project Description:

Objectives:

1. To determine whether the MIT is a satisfactory means of determining antipoliovirus antibodies in immune globulin preparations.

2. To obtain sufficient data to enable standards to be established for this product.

Major Findings: The MIT is a satisfactory means of assaying for antipoliovirus antibodies in immune globulin preparations. Preliminary data have been obtained for 81 lots of polio immune globulin representing 9 manufacturers.

Significance to the Program of the Division: The work will provide DBS with a basis for controlling the poliovirus antibody content of immune globulin preparations.

Proposed Course: This is a continuing project

Part B included yes /___/

Serial No. DBS 26
1. Viral Immunology
2. Section on Serology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : The Determination of Antipoliovirus Antibodies by the Metabolic Inhibition Test (MIT).

Principal Investigator: Dr. B. William Uhlendorf

Other Investigators : Miss Phyllis Fabisch

Cooperating Units : The Section on Tissue Culture, LVI

Man Years:

Total	:	2.8
Professional	:	0.4
Other	:	2.4

Project Description:

Objectives:

1. To screen for the presence of antipoliovirus antibodies in pre-inoculation sera of animals used for testing poliomyelitis vaccine and poliovirus vaccine, live, oral, and in sera of other experimental animals.

To determine the level of antibodies in post-vaccination sera from monkeys and chicks and for poliomyelitis vaccine potency tests, in sera of other experimental animals, and in human sera.

2. To improve reliability of MIT by modification of technique.

Major Findings:

1. During the year approximately 3203 sera of various species were titered for antibody content against the three types of poliovirus and 9265 sera (6092 monkey and 3173 chick sera) were screened.

2. A method of assaying the metabolic activity of the cells prior to use on the MIT has led to a more reproducible technique. The u[illegible] of a continuous line of cells (Hep 2) for [illegible] good results and in many ways is more desirab[illegible] [illegible] kidney cells.

Significance to the Program of the Division: Integral part of DBS testing program.

Proposed Course: This is a continuing activity

Part B included yes / / no / X /

Serial No. DBS 27
1. Viral Immunology
2. Section on Serology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : The Antigenic Potency of Poliomyelitis Vaccine.

Principal Investigator: Dr. B. William Uhlendorf

Other Investigators : Miss Phyllis Fabisch

Cooperating Units : Section on Pathology, LVI

Man Years:

Total	:	1.7
Professional	:	0.4
Other	:	1.3

Project Description:

Objectives:

1. To determine the antigenic potency of poliomyelitis vaccine.

2. To develop an improved potency test.

Major Findings:

1. During the year 11 vaccines were tested by the monkey potency test and 20 by the chick potency tests of two designs involving the use of 132 monkeys and 3349 chicks.

2. The quantal type chick test is a reliable test for determining the antigenic potency of poliomyelitis vaccine and in some respects more valid than the monkey potency test.

3. Limited experience with a factorial test in chicks, which is a graded response type assay, indicates that it may be more reliable than the monkey potency test or the quantal chick potency test.

Significance to the Program of the Division: This is a portion of the DBS poliomyelitis vaccine control program.

Part B included yes / / no / x /

Serial No. DBS 28
1. Viral Immunology
2. Section on Serology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Development of New Electronically Controlled Automatic Diluting Machine.

Principal Investigator : Dr. B. William Uhlendorf

Other Investigators : Miss Phyllis Fabisch

Cooperating Units : None

Man Years:

Total	:	0.2
Professional	:	0.1
Other	:	0.1

Project Description:

Objectives: To further develop the automatic diluting machine and obtain data for its application to serologic procedures such as metabolic inhibition tests, hemagglutination titrations, hemagglution-inhibition titrations and complement fixation titrations, and to develop techniques and associated equipment so that these procedures can be performed on a semimicro scale.

Major Findings:

1. This machine which makes replicate serial dilutions in disposable plastic cup-plates is faster and more precise than standard techniques which employ serological pipettes and glass tubes. It has been modified to make it usable with smaller volumes.

2. Disposable white styrene cup-plates have been designed and are now being manufactured by the Linbro Chemical Company. These plates are suitable for the techniques stated above and in them serial dilutions can be made in volumes as small as 0.05 ml or as large as 0.5 ml using the diluting machine.

3. Diluting machines based on the one developed in the laboratory are being manufactured by the American Instrument Company and the National Instrument Company. The new cup-plates and diluting machines will be available to the scientific public.

Significance to the Program of the Division: This apparatus has increased the amount of work which can be done by the present staff.

Proposed Course: This project is completed and manuscript describing the apparatus and its applications is being prepared.

Part B included yes / / no / X /

Serial No. DBS 29
1. Viral Immunology
2. Section on Animal Test
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Studies on the Sensitivity of Cell Cultures to Poliovirus and SV-40.

Principal Investigator : G. L. Van Hoosier, Jr., D.V.M.

Other Investigators : None

Cooperating Units : Section on Tissue Culture, LVI

Man Years :

Total	:	0.4
Professional	:	0.1
Other	:	0.3

Project Description:

Objectives: To determine the sensitivity of cell cultures, used for poliomyelitis vaccine safety tests, to poliovirus and SV40.

Methods Employed: Poliovirus is titrated in each tissue cell lot both before and after use in the safety test. When tissue cell preparations are used for safety tests of poliovirus vaccine or for the detection of residual SV40, sensitivity tests are carried out on the respective tissue cell lots. Only cell culture systems which show suitable sensitivity are considered acceptable for safety tests of vaccines.

Major Findings: All cell cultures examined have been consistently sensitive to poliovirus. Cumulative results of 13 assays of SV40 in kidney cell culture prepared from C. aethiops have indicated a mean titer titer of $10^{6.82}$ $TCID_{50}$ per 0.1 ml for the reference virus with a low of $10^{6.33}$ (one time) and titers as high as $10^{7.5}$ (two times) as determined by 14 day observation periods.

Significance to the Program of the Division: Provides control of sensitivity of safety test systems.

Proposed Course: This is a continuing activity

Part B included: Yes/ / No/X/

Serial No. DBS 30
1. Viral Immunology
2. Section on Animal Testing
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Part A Calendar Year 1961

Project Title : Isolation and Identification of Poliovirus from the Central Nervous System of Monkeys Inoculated with Live, Attenuated Poliovirus Vaccine.

Principal Investigator : G. L. Van Hoosier, Jr. D.V.M.

Other Investigators : Drs. Kirschstein and Gerber.

Cooperating Units : Section on Pathology and Tissue Culture, LVI

Man Years :

Total	: 0.3
Professional	: 0.1
Other	0.2

Project Description :

Objectives: To determine the correlation of histologic lesions of poliomyelitis, i.e. neurovirulence, with the presence and titer of virus in the lumbar and cervical cord tissues.

Methods Employed: Standard virus isolation procedures.

Major Findings: The presence of virus was correlated with the presence of specific histologic lesions although in some instances no virus was found in tissues where lesions of poliovirus infection were seen.

Significance to the program of the Division: Such information may prove of value in evaluating various lots of live, attenuated poliovirus vaccine.

Proposed Course: To be continued.

Part B included: Yes /X/ No /___/

Honors, Awards and Publications.

Publications other than abstracts from this project:

1. Paul Gerber, George A. Hottle and Robert E. Grubbs. Inactivation of Vacuolating Virus (SV40) by Formaldehyde. Proc. Soc. Exp. Biol. Med. 108: 205-209, 1961.

2. Paul Gerber. An Infectious Deoxyribonucleic Acid Derived from Vacuolating Virus (SV40). Virology (in press).

3. C. W. Hiatt, Paul Gerber and Robert M. Friedman. Photodynamic Inactivation of the Vacuolating Virus (SV40). Proc. Soc. Exp. Biol. Med., (in press).

Serial No. DBS 31
1. Viral Immunology
2. Animal Test Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Ecological and Epidemiological Studies on Selected Simian Viruses in Jungle and Laboratory Monkeys.

Principal Investigator : G. L. Van Hoosier, Jr., D.V.M.

Other Investigators : Dr. Harry Meyer

Cooperating Units : Section on General Virology, LVR

Man Years :

Total	: 0.8
Professional	: 0.5
Other	: 0.3

Project Description:

Objectives: To define the ecological and epidemiological patterns of infection of rhesus monkeys with commonly occurring simian viruses.

Methods Employed: Similar to methods previously described for other animal viruses.

Major Findings:

1. Infection rates in monkeys trapped and handled under normal conditions are quite high, i.e. 90-100% for SV-5 and SV-12 and low, i.e. about 10% for SV-2 and SV-59.

2. In monkeys handled under isolated conditions from the time of trapping, the infection rate with SV-5 was similar to that for other monkeys, while the infection rate with SV-12 was reduced by 40%.

Significance to the Program of the Division: Such studies may indicate methods of handling monkeys that would reduce the frequency of simian virus contaminants of kidney cell cultures; such information provides more fundamental knowledge about epidemiological patterns with different types of viruses.

Proposed Course: To be continued, as study is incomplete to date.

Part B included: Yes / / No / X /

Serial No. DBS 32
1. Viral Immunology
2. Section on Animal Test
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title : Investigations of the Serologic and Biologic Properties of the Simian Viruses.

Principal Investigator : G. L. Van Hoosier, Jr., D.V.M.

Other Investigators : None

Cooperating Units : Section on Tissue Culture LVI

Man Years :

Total	:	2.0
Professional	:	0.3
Other	:	1.7

Project Description:

Objectives: To prepare reagents and acquire information needed to identify viral agents encountered in safety tests of poliomyelitis and adenovirus vaccine.

Methods Employed: Various serological, immunological and pathological techniques in general use in virology are employed.

Major Findings:

1. Specific antisera of acceptable titer have been prepared in rabbits by standard immunization procedures for the following viruses: SV-1, SV-2, SV-4, SV-12, SV-36, SV-40, and SV-59. In addition, antisera were obtained for SV-5 and B-Virus.

2. Hemagglutination with cells of monkeys, human, chicken, rat and guinea pig has been used to classify prototype simian viruses. The hemagglutination-inhibition reaction has been used to assay antibody in serums from rabbits and monkeys. Non-specific inhibitors of hemagglutination in these serums have been removed by treatment with kaolin.

3. The cell culture host range of each of the prototype simian viruses has been studied and some variations have been observed.

4. A continuous Rhesus kidney cell line, LLC-MK2, has been found satisfactory for propagation of a majority of the known simian viruses.

5. A plaque assay system has been developed for two prototype simian viruses (SV-2 and SV-4). It permits studies of a more quantitative nature and will be used to characterize unknown viral agents.

6. The determination and susceptability of viral agents to sodium desoxycholate has provided a method for classifying simian viruses into resistant and susceptible groups.

7. Neutralization studies of viral agents isolated by Dr. Malherbe have indicated a relationship between SV12 and SA3, and to a lesser degree, between SV4 and SA4.

Significance to the program of the Division: These studies provide data needed for the identification of viral agents encountered in vaccine safety tests and serve as a basis for the design of further investigation of simian viruses.

Proposed Course: To be continued.

Part B included yes /___/ no/_X_/

Serial No. DBS 33
1. Laboratory of Virology
& Rickettsiology
2. Section on Basic Virology
& Rickettsiology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: General aspects of virology and rickettsiology

Principal Investigator: Dr. Joseph E. Smadel

Other Investigators: Miss Elizabeth B. Jackson, Dr. J. Anthony Morris

Cooperating Units: None

Man Years: (calendar year 1961)
Total: Inconsequential

Project Description:

Objectives: This particular project is included among those of the Laboratory of Virology and Rickettsiology in order to provide a mechanism for reporting work which does not fall clearly within the purview of other project reports. One of the most important duties of this laboratory is to keep abreast of advances in the expanding field of virology, especially as they relate to the development of new vaccines. One way of doing this is by attendance at and participation in various conferences and symposia. The report lists several publications in the general field of immunology, virology and rickettsiology.

Major Findings: While no laboratory research was undertaken on trachoma during the calendar year, interest in this disease continues. Two members of the section attended a 3-day conference on the Biology of the Trachoma Agent sponsored by the New York Academy of Sciences. One served as chairman of the session on Immunologic Studies in which development of experimental vaccines was a major topic. The other read a paper on Complement Fixation in Trachoma for the Naval Medical Research Unit #2 in Taipei, Taiwan. Dr. B. Eddie of the G. W. Hooper Foundation, University of California Medical School, spent a week as guest worker comparing serologic techniques employed in the study of viruses of the psittacosis-lymphogranuloma-trachoma group.

Three members of the section participated in a symposium on Scrub Typhus sponsored by the Rickettsial Commission of the Armed Forces Epidemiological Board. The symposium papers are to be

published in a monograph.

One member participated during the year in the meetings of the Gould House Group of American Investigators of Arthropod-borne Viruses in order to evaluate developments in the immunization of man against arbor viruses.

Significance to Biomedical Research and the Program of the Division: Constant review of immunization procedures for viral and rickettsial diseases from the point of view of informing the physician of the value of current vaccines is a contribution which this laboratory can make to preventive medicine.

Unforeseen problems of an acute nature arise in this field from time to time. These may be solved in a relatively short interval by intense study. Therefore, it is important to maintain a nucleus of experienced workers well grounded in basic virological techniques who can be deployed at short notice to assist in such contingencies.

Proposed Course of Project: Work will be continued along the lines described.

Part B.

Included Yes X No

Part B. Honors, Awards, and Publications

Publications other than abstracts from this project:

Woodward, T. E., and Smadel, J. E.: Rickettsial infections. In Harrison, T. R. (ed.) :Principles of Internal Medicine, 4th ed. New York, McGraw-Hill Book Co. Inc., in press.

Smadel, J. E. : Epidemic hemorrhagic fever. Ibid.

Smadel, J. E. : Rocky Mountain spotted fever. In McDermott, W. and Beeson, P. B. (eds.) : Cecil-Loeb Textbook of Medicine, 11th ed. Philadelphia, W. B. Saunders Co., in press.

Smadel, J. E. : Rickettsialpox. Ibid.

Smadel, J. E. : Scrub typhus. Ibid.

Smadel, J. E. : Scientific problems remaining unsolved in measles immunization. American J. Dis. Child., in press.

Serial No. DBS 34
1. Laboratory of Virology & Rickettsiology
2. Basic Virology & Rickettsiology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Growth and Metabolism of Rickettsiae

Principal Investigator: Hope E. Hopps

Other Investigators: J. E. Smadel, M. D., J. L. Showacre (NIAID)
B. C. Bernheim

Cooperating Units: Cytology and Metabolism Unit, NIAID

Man Years: (calendar year 1961)
Total: 1/4
Professional: 1/6
Other: 1/12

Project Description:

Objectives: The main objective is the accumulation of information which may lead to eradication of the carrier state through studies on tissue cultures infected with rickettsiae or Salmonella typhosa and subjected to various experimental procedures.

Methods Employed: The ordinary procedures used in a research laboratory engaged in studies on rickettsial and other microbial agents were employed.

Major Findings: Carrier state in typhoid fever. During the calendar year 1961 the efforts of the group were diverted almost entirely to studies concerning simian virus 40. Hence, advances in this project were minimal.

Significance of the Program to the [illegible]. The carrier state and the resistance of intracellular microbes to antibiotics are among the more important problems facing those interested in the control of infectious diseases.

Proposed Course of the Project. Within the near future, the group will again resume its investigations of [illegible] infection with particular emphasis on the possible role of [illegible] antibody formation in host cells infected with rickettsiae and to determine

whether such a process is important in the clearing mechanisms which, in nature, lead to recovery of the cell and the host.

Part B.

Included Yes X No _____

Part B. Honors, Awards, and Publications

Publications other than abstracts from this project.

Showacre, J. L., Hopps, H. E., du Buy, H. G. and Smadel, J. E.: Effect of antibodies on intracellular Salmonella typhosa. I. Demonstration by Phase microscopy of prompt inhibition of intracellular multiplication. J. Immunol., 87: 153-161, 1961. (Listed in 1960 report as in press).

Hopps, H. E., Smadel, J. E., Bernheim, B. C., Danauskas, J. X., and Jackson, E. B.: Effect of antibiotics on intracellular Salmonella typhosa. II. Elimination of infection by prolonged treatment. J. Immunol., 87: 162-174, 1961. (Listed in 1960 report as in press).

under varying conditions by the Department of Biologics Research, WRAIR. Aliquots of these lyophilized materials stored at various temperatures have been tested at frequent intervals to determine their stability. Toxin content was measured in mice and infectivity titrations (ELD_{50}) were performed in embryonated eggs. The infectivity of the preparations diminished tenfold during the process of lyophilization, i.e., frozen wet control preparation had an ELD_{50} of $10^{7.6}$ while that of the dried materials was $10^{6.4}$. On storage, such lyophilized preparations underwent a further loss in infectivity, however, aliquots kept at 5°C have remained stable at 10^5 ELD_{50} for one year and those at room temperature for at least 6 weeks. Materials stored at 35°C also maintained this titer for at least 5 days, but after 13 days at this temperature there was a further loss; the ELD_{50} was now 10^4 which is equivalent to $10^{6.0}$ to $10^{7.0}$ egg infectious units when expressed as EID_{50}. Since the minimum effective dose in man has been found to be 10^4 to 10^5 egg infectious units, these dried materials stored at 35°C for 2 weeks still contained several hundred human immunizing doses and hence should be suitable for vaccination of man.

(2) Animal studies. It was reported last year that some guinea pigs resisted a challenge of 10^5 guinea pig ID_{50} of virulent strain Breinl if they had been injected 28 days previously with as little as 10^2 ELD_{50} of strain E. The interesting point was that these animals, at the time of challenge with Breinl organisms, had no detectable complement fixing (CF) or toxin neutralizing (TN) antibodies. In the past, TN antibodies have been correlated with resistance. The observation again raised the question of the nature of the antibody responsible for immunity. The present work extends these observations.

A. Amnestic response in sensitized guinea pigs. A group of 115 guinea pigs were inoculated subcutaneously with 10^1 or 10^2 ELD_{50} of strain E, a dose which did not induce formation of either CF or TN antibodies in 79 of these animals. Twenty-six of the antibody-free animals, 28 days after their strain E injection, together with 28 control guinea pigs were inoculated by the subcutaneous route with 0.5 ml amounts of formalin inactivated epidemic typhus vaccine. On days 3, 5 and 7 some of the animals in the test and control group and on day 10 all the guinea pigs in both groups were bled to obtain material for serologic tests. By day 3, CF antibody had appeared in low titer (1:2) in 4 of 8 E strain guinea pigs examined and in none of 10 controls. TN antibody had appeared in none. By day 5, the mean CF and TN antibody titers in the strain E conditioned pigs were 128 and [illegible] and in the control pigs, 0 and 2. On day 7, these values were 512 and 62 in the conditioned pigs and 16 and 16 in the controls. By day 10 the serum levels of CF and TN antibodies (mean values 1024 and 256) in the conditioned pigs were far higher than those found in the control guinea pigs (128 and 16).

These results clearly demonstrate that injection of only 10^1 or 10^2 ELD_{50} of strain E into guinea pigs sensitizes the animals to subsequent homologous antigenic stimulus.

B. Resistance to Breinl challenge in sensitized guinea pigs. To determine whether the sensitized state in guinea pigs induced by injection of a small number of ELD of strain E was associated with resistance to challenge with virulent strain Breinl, a group of 53 guinea pigs were inoculated with 10^1 to 10^2 ELD_{50} of E strain and 28 days later were challenged with 10^5 guinea pig ID_{50} of the Breinl strain. The febrile response of these challenged guinea pigs was compared with that of a group of 52 nonsensitized control guinea pigs inoculated with a similar amount of Breinl organisms. While only 6 of the sensitized pigs remained afebrile during the 21-day post-challenge observation period, the average duration of fever was only 1.6 days for the animals originally vaccinated with E strain. This represented a significant reduction in the febrile response to challenge (average 3.6 days) displayed by the control animals.

In this experiment as in the one mentioned above, guinea pigs prepared by an inoculation of 10^1 or 10^2 ELD_{50} of strain E developed CF and TN antibodies earlier than did the normal animals following challenge with Breinl organism. However, the serologic response was less rapid and less extensive than that of similarly prepared animals which were given a booster dose of killed vaccine.

Thus, none of 16 prepared animals had detectable antibodies before or 5 days after challenge and only 8 of 20 were positive on the 7th day at which time all of the challenged nonsensitized animals were still without antibodies. By the 10th day after challenge, every animal in the study possessed antibodies; the average titers for CF and TN antibodies were 1024 and 512, respectively, in the sensitized group and 128 and 16 in the nonsensitized group.

It appears reasonable that the appreciable resistance to challenge displayed by guinea pigs which are without CF or TN antibodies after inoculation with small amounts of the avirulent E strain is associated with the booster phenomenon. The E strain material which failed to induce detectable antibodies, nevertheless, sensitized the animals so that they responded more rapidly than normal animals to the antigenic stimulus provided by the Breinl organisms. The early serologic response presumable contributed to the partial resistance of the sensitized animals to the challenge inoculum.

Significance to Biomedical Research and the Program of the Division: Since rickettsiologists and health officers recognize the need for an attenuated vaccine for the control of epidemic typhus in conditions of catastrophe, it behooves the DBS to acquire familiarity with the problem and contribute to the solution of its biologics control aspects.

Proposed Course of the Project. Work will be continued along the lines described above.

Part B.

Included Yes_____ No X

Serial No. DBS 36
1. Laboratory of Virology & Rickettsiology
2. Basic Virology & Rickettsiology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Studies with Simian Virus 40. Development of a continuous tissue culture cell line from Cercopithecus aethiops kidney tissue.

Principal Investigator: Mrs. Hope E. Hopps

Other Investigators: Mrs. Barbara C. Bernheim and Dr. Ananda Nisalak (Guest worker)

Cooperating Units: None

Man Years: (calendar year 1961)
Total: 3
Professional: 2
Other: 1

Project Description:

Objectives: The main objective is to establish a line of Cercopithecus aethiops kidney tissue free of microbial contaminants, simian or otherwise, which would be suitable for use in laboratory studies with SV40. Brief mention of attempts to establish such a line was made in the 1960 Annual Report under the project heading "Investigations Concerning Vacuolating Virus (VV)." Because of the expanded effort, these studies are considered as a separate project in the 1961 report.

Methods Employed: Modern tissue culture techniques and the ordinary procedures used in a research laboratory engaged in studies on viral and rickettsial agents were employed.

Major Findings. In March of 1960, freshly initiated cultures of C. aethiops kidney were placed in a medium consisting of balanced salt solution, fetal calf serum and Difco yeastolate. Since that time the culture, designated BS-C-1, has been cultivated through 39 passages. Cultures which were frozen and stored for several months were successfully revived and propagated. Inoculation of BS-C-1 cultures with simian virus 40 at the 7th passage level revealed a sensitivity

equal to that of primary cercopithecus kidney cell cultures both as regards time of appearance of typical vacuolating changes in cells following inoculation with comparable amounts of virus and in maximum yield of virus obtained. Similar observations at the 11th, 16th, 21st, 28th and 34th passages of the BS-C-1 line indicated that susceptibility of the cells to SV_{40} remained unaltered. Titration of Enders attenuated measles virus and poliovirus types 1, 2 and 3 in BS-C-1 cultures gave endpoints comparable to those obtained when aliquots of the virus material were titrated simultaneously in cell systems commonly employed for these agents.

Significance of the Program to the Institute. The availability of a continuous cell line of C. aethiops kidney affords a useful system for: (1) diagnostic isolation of SV_{40}, and (2) production of high titer SV_{40} antigens apparently free of other simian agents. Since contamination of primary simian tissue cultures with a number of indigenous agents is an ever-present problem in all areas of tissue culture virology, it is hoped that the continuous BS-C-1 line may have broader application. Interest in using this cell line is evidenced by the number of requests for cultures received in this laboratory, including several from Army houses concerned in poliovirus vaccine production. Moreover, the line has been given to Microbiological Associates, Inc., who hope to make cultures commercially available within the next month or so.

Proposed Course of the Project. Further investigation concerning virus susceptibility of BS-C-1 cultures are now in progress. Upon completion of these studies, experimental work will be minimal unless further problems arise which may require use of these cells. Moreover, the line will continue to be maintained in this laboratory and will be examined from time to time for susceptibility to simian virus 40.

Part B.

Included Yes X No ____

Part B. Honors, Awards and Publications

Publications other than abstracts from this project:

Early studies concerning the susceptibility of the BS-C-1 line to SV40 are included in the following manuscript.

Meyer, H. M., Jr., Hopps, H. E., Rogers, N. G., Brooks, B. E., Bernheim, B. C., Jones, W. P., Nisalak, A. and Douglas, R. D.: Studies on simian virus 40, J. Immunol., in press.

Serial No. DBS 37
1. Laboratory of Virology & Rickettsiology
2. General Virology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Investigations Concerning Measles Virus and Vaccine

Principal Investigator: Dr. Harry M. Meyer, Jr.

Other Investigators: Miss Nancy G. Rogers, Dr. Daniel D. Hostetler, Jr. and Mrs. Barbara Brooks Jackson

Cooperating Units: Department of Pediatrics, Walter Reed General Hospital, Washington, D. C.
Babies Hospital, Columbia-Presbyterian Medical Center, New York, New York
Pediatric Metabolism Branch, NIAMD, NIH

Man Years: (calendar year 1961)
Total: 3 3/4
Professional: 1 3/4
Other: 2

Project Description:

A. Clinical studies with live measles vaccine.

A single lot of avianized Edmonston strain attenuated measles vaccine is being used in tests involving normal and "high risk" children and susceptible monkeys. That portion of the study dealing with simians is reported under subtitle "D". The purpose of the clinical study is to evaluate the response to the vaccine given alone or with human gamma globulin in normal children and ones suffering from various chronic diseases. Cooperating groups include Walter Reed General Hospital (normal children), Babies Hospital (children with cardiac disease) and the National Institute of Arthritis and Metabolic Diseases (children with fibrocystic disease).

The vaccine inoculum in each instance has contained about 1000 $TCID_{50}$ of virus; those receiving gamma globulin were injected with 0.02 ml. of globulin per pound of body weight in the opposite extremity immediately after vaccine inoculation.

The vaccine has been well tolerated by normal children with or without concurrent gamma globulin. Fever, when it occurred, was not

present before the 7th post inoculation day and rarely persisted for more than 3 days. The maximum febrile reaction in normal children was 104°F; this was not associated with other symptoms of overt disease. In a group of vaccinees with fibrocystic disease, on the other hand, a febrile reaction in excess of 106° F. was observed in two individuals receiving the attenuated virus without globulin. On the other hand, fibrocystic patients and ones with severe cardiac disease have tolerated the vaccine well when accompanied by gamma globulin. One infant with adrenogenital syndrome has been vaccinated by this method without untoward reaction. To date, all susceptible children vaccinated have subsequently developed antibodies, indicating 100 per cent efficacy.

These studies are being gradually expanded as the degree of clinical safety is established. An NIH team is currently in the Republic of Upper Volta, Africa, conducting a vaccine trial in an attempt to define the acceptability of the live vaccine in a population suffering from many chronic maladies, nutritional, infectious, and parasitic.

B. Studies directed toward standardization of the measles virus neutralization and complement-fixation tests.

These studies, initiated in 1960, were completed at the end of 1961. Standard procedures were defined on the basis of data accumulated (see report for 1960) and these results made available to potential manufacturers of measles vaccine and gamma globulin and to other interested parties. Reproducibility of the standard neutralization test under conditions of routine testing with the measles reference serum was found to be satisfactory (less than 4-fold variation).

C. Studies concerned with the production of measles reference serum.

The measles reference antiserum was prepared in 1960 as previously described (see report for 1960). This reagent was made available to interested groups during 1961. Study of the reference material using the standardized complement-fixation and virus neutralization techniques revealed measles antibody titers of 1:1024 and 1:1021, respectively. This project is now completed.

D. Markers of virulent and attenuated measles virus in rhesus monkeys.

An experiment is in progress in an attempt to define possible in vivo markers for virulent and attenuated measles virus. Two groups of measles susceptible rhesus monkeys have been inoculated by various CNS routes with either low passage Edmonston measles virus ("virulent") or attenuated measles virus (Enders B level vaccine). These monkeys have been observed for clinical and clinical-pathological changes and tested for evidence of communicability. Isolation specimens and

serum samples were collected periodically for assay. At 19 days the inoculated animals were sacrificed; the brains and cords were preserved for histopathology and attempted virus recovery.

Hopefully, data obtained from these studies will serve as a guide for the development of a test that will distinguish between virulent and attenuated strains.

E. Comparison of methods available for the primary isolation of virulent measles virus and recovery of tissue culture adapted and attenuated measles strains.

Work comparing the sensitivity of various types of cell cultures for both virulent and attenuated measles virus was continued. Results obtained indicated that Salk monkey heart cultures were as sensitive in detecting small amounts of virus as any of 8 other tissue culture types tested. Primary human kidney, the indicator of choice for detecting wild measles strains, was much less effective in assaying the adapted virus.

F. Ecology of measles in monkeys.

Because of the need for measles susceptible monkeys for work in the vaccine program, a study was conducted to elucidate the ecology of measles in monkeys. Monkeys representing all three commonly used species, i.e., Macaca mulatta, Macaca cynomolgus and Cercopithecus aethiops, were found to possess antibodies for measles virus when tested after reaching this country. A field trip was made to the Indian jungle during which 116 rhesus were trapped, bled and transported to the NIH where further serum samples were obtained at regular intervals. Serologic studies and general evaluation of handling and transport methods indicated that free-living monkeys are probably rarely if ever infected with measles, but that during captivity the virus is probably periodically introduced by contact with infected children. Under the conditions of simian handling, the agent finds an ideal ecologic situation. Thus, there is a constant epizootic of measles in the large exporting and importing compounds, resulting in delivery of measles-infected animals to the research laboratory. Proposed methods for preventing this included rapid handling of simians as small isolated shipments, with overseas transportation in the cargo compartments of passenger-carrying jet aircraft. These techniques are currently being utilized by others to a degree in the handling of cynomolgus and African Green monkeys.

G. Evaluation of methods for potency estimations of live measles vaccine.

Data obtained in studies mentioned under subtitle E above indicated that several types of cell cultures were comparably sensitive in detecting small amounts of the avianized Edmonston strain of measles virus (the attenuated vaccine). The Salk monkey heart line was designated as the type to be used for the DBS live measles potency test, since they were free of extraneous viruses (especially wild measles) and the monolayers could be maintained in good condition for at least two weeks. This period of observation of inoculated cultures was found to be important in obtaining the maximum sensitivity practical. Repeated virus titrations indicated that the cell culture assay system was reproducible within a range of plus or minus one-half log under conditions of routine use.

A titrational reference standard measles strain has been made available to potential vaccine manufacturers, along with a description of the standard potency test procedure. This is expected to lead to accurate control of potency with the live vaccine.

H. Standardization of testing procedure for a measles immune gamma globulin.

This procedure has been defined for manufacturers and is controlled by the standard measles reference serum which was made available on June 13, 1961 (see subtitles B and C above).

Significance to Bio-medical Research and the Program of this Division. Measles is a disease of considerable clinical and public health significance. The acute disease process is associated with an appreciable morbidity and mortality, and in addition there is reason to suspect that measles infection may be frequently responsible for central nervous system damage. The prevention of measles consequently is a matter of enormous practical importance. All work done by this section pertaining to measles is directly concerned with one or another of the many problems associated with the development of measles vaccine.

Part B.

Included Yes x No

Part B. Honors, Awards, and Publications

Publications other than abstracts from this project:

Meyer, H. M. Jr., Brooks, B. E., Douglas, R. D., Rogers, N. G.: Ecology of measles in monkeys, Am. J. Dis. Child., in press.

Meyer, H. M. Jr., Brooks, B. E., Douglas, R. D., Rogers, N. G.: Potency of live measles vaccine. Am. J. Dis. Child., in press.

Meyer, H. M. Jr., Brooks, B. E., Douglas, R. D., Rogers, N. G.: Measles serologic standards. Am. J. Dis. Child., in press.

Serial No. DBS 38
1. Laboratory of Virology & Rickettsiology
2. General Virology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Investigations Concerning the Spotted Fever Group of Rickettsiae

Principal Investigator: Dr. Harry M. Meyer, Jr.

Other Investigators: Miss Nancy G. Rogers

Cooperating Units: None

Man Years: (calendar year 1961)
Total: None

Project Description:

Terminated due to pressure of other studies.

Part B.

Included Yes ___ No X

Serial No. DBS 39
1. Laboratory of Virology & Rickettsiology
2. General Virology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Investigations Concerning Vacuolating Virus (SV_{40})

Principal Investigator: Dr. Harry M. Meyer, Jr.

Other Investigators: Miss Nancy G. Rogers, Dr. Daniel D. Hostetler, Jr. and Mrs. Barbara Brooks Jackson

Cooperating Units: None

Man Years: (calendar year 1961)
Total: 4 5/6
Professional: 1 3/4
Other: 3 1/6

Project Description:

A. Ecology of SV_{40} in monkeys

Studies of SV_{40}, as begun and reported in the annual report of 1960, have continued with renewed interest since the finding of Goffe and Hale that this agent is relatively resistant to the action of formaldehyde, and the reports of several workers that young hamsters injected with monkey kidney cell cultures infected with this agent develop tumors. Most of our emphasis has been directed toward ways and means of detecting this agent in rhesus monkeys whose kidneys are destined to be the source of monkey kidney tissue cultures and toward elucidating the ecology and pathogenesis of this agent.

The sera of 38 NIH monkeys were tested by neutralization test for antibodies to SV_{40}. Eleven monkeys which were negative and eleven which were positive were selected for further study. Beginning with the negative animals at about two weeks after the initial bleeding the monkeys were sacrificed and their trypsinized kidneys were seeded in 32 oz. prescription bottles, 5 bottles per monkey. All monkeys were bled again at the time of sacrifice. Fluids were collected and pooled from each set at 6 and 21 days after cultures were planted. These fluid harvests were titrated in green monkey kidney tissue culture. Eleven of the 21 sets of rhesus monkey renal tissue (one failed to grow) yielded virus. Seventeen of the 22 sacrifice

sera containing neutralizing antibody to SV_{40}. Thus, it would seem that pretesting of monkeys by the neutralization test to select SV_{40}-free animals is not sufficiently sensitive to insure virus-free renal cell tissue cultures.

The rhesus monkeys which were trapped and bled in India under the supervision of a member of this section were studied for SV_{40} as well as measles antibodies. Using sera drawn at NIH one week after arrival (2-6 weeks after capture), all monkeys were tested by neutralization test for antibody to the vacuolating virus. Thirteen were positive. Of these, six appeared to be old infections as evidenced by nearly identical pre-(jungle) and post-(1st NIH) bleedings; three were probably infected at the time of capture as indicated by positive and rising titers on the two bleedings; and four were possibly infected after capture as shown by conversion from negative to positive.

These monkeys were carefully followed with neutralization studies on sera obtained at two and later at 3-week intervals through seven bleedings. As had been postulated, it was possible to demonstrate a radial spread of infection from those monkeys which arrived at NIH with active or latent infection. During this period, those monkeys housed in a single module in which (fortuitously) there was no original infection, remained virus-free for the duration of this experiment. Efforts to delineate a) the mode of spread and b) duration of infection, using the above mentioned "clean" monkeys, will be detailed in the following subtitle.

In continuing to search for sources of SV_{40}-free monkeys, the sera of 37 rhesus from the NIH monkey colony on the island of Cayo Santiago, P.R. were tested by neutralization test for antibodies to this agent. All were negative. Twenty additional sera from monkeys from this island are presently under study.

B. Pathogenesis of SV_{40}.

Pathogenesis of SV_{40} in African green monkeys was studied and the results were incorporated with others from LVR in a paper summarizing our experience to date with this agent. Briefly, two susceptible green monkeys were inoculated with SV_{40} while the third non-immune animal served as an uninoculated cage contact. All 3 developed complement fixing and neutralizing antibodies, and virus was recovered from the throats and blood of all three and from the two inoculated animals. No overt disease was noted. The three animals were sacrificed 4-1/2 months after the original inoculation of the virus and SV_{40} was isolated from all of the trypsinized kidneys, but not from lung or spleen.

Expansion of this study is in progress in rhesus monkeys. Twenty susceptible monkeys recently obtained from India were inoculated with SV_{40} (strain 776, Hilleman) by a variety of routes. Five of these, along with two SV_{40}-immune animals were inoculated in conformance with the standard polio safety test technique. Six additional susceptible monkeys served as cage contact and room contact controls.

Detailed clinical and clinical pathological studies have been performed. Isolation specimens and serum samples have been collected periodically and are presently in test. At various intervals, certain animals are being sacrificed for histopathological studies and virus isolation attempts. Several monkeys will be held for long-term observation.

Successful completion of these studies should define the pathological potential and dynamics of infection of SV40 in its natural host, the rhesus monkey.

Significance to Biomedical Research and the Program of this Division: By virtue of its presence as a contaminant in various vaccines, SV_{40} has been administered to large numbers of humans both by oral and parenteral routes. Because of the high incidence of infection with this agent in laboratory monkeys, it is frequently detected as a latent virus in simian renal tissue cultures, thus presenting a problem to scientists employing primary cultures derived from this source.

All work done by this section pertaining to SV_{40} is concerned either with elucidating the properties of this agent in laboratory hosts or in accumulating data potentially useful in selection of monkeys free of the infection for kidney cell culture production.

Part B.

Included Yes X No

Part B. Honors, Awards, and Publications

Publications other than abstracts from this project:

Meyer, H. M. Jr., Hopps, H. E., Rogers, N. G., Brooks, B. E., Bernheim, B. C., Jones, W. P., Nisalak, A., Douglas, R. D.: Studies on Simian Virus 40. J. Immunol., in press.

Serial No. DBS 40
1. Laboratory of Virology & Rickettsiology
2. General Virology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Investigations Concerning Lymphocytic Choriomeningitis (LCM) Virus

Principal Investigator: Dr. Harry M. Meyer, Jr.

Other Investigators: Miss Nancy G. Rogers

Cooperating Units: None

Man Years: (calendar year 1961)
Total: None

Project Description:

As reported in Annual Report 1960, use of guinea pigs inoculated by intracerebral and intraperitoneal routes with dilutions of lymphocytic choriomeningitis virus and testing their sera by complement-fixation, proved to be a sensitive method for detecting minute amounts of this agent. Due to the pressure of other work, this project has been terminated.

Part B.

Included Yes_____ No X

Serial No. 41

1. Laboratory of Virology & Rickettsiology
2. General Virology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Investigations Concerning Mumps Virus

Principal Investigator: Dr. Joseph P. O'Malley

Other Investigators: None

Cooperating Units: None

Man Years: None

Project Description:

Due to the press of other investigations, no material contributions were made to the project during the year, and it has been terminated. If at a future time it appears opportune to reopen the project, studies may again be initiated.

Part B.

Included Yes_____ No X

If laboratory cultivation of the etiologic agent or agents can be accomplished, then effective control of human hepatitis becomes theoretically possible.

Serial No. DBS 43
1. Laboratory of Virology
& Rickettsiology
2. Section on Respiratory Viruses
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: SV_{40} virus: Pathogenicity for man

Principal Investigator: Dr. J. A. Morris

Other Investigators: Mr. C. G. Aulisio, Dr. K. M. Johnson (NIAID)
Dr. R. Chanock (NIAID), and Dr. V. Knight (NIAID)

Cooperating Units: Laboratory of Infectious Diseases and Laboratory of Clinical Investigations, NIAID

Man Years:
Total: 9/16
Professional: 1/16
Other: 1/2

Project Description:

Objectives. Determination of clinical and serologic responses in volunteers given SV_{40} virus by respiratory route.

Methods: Standard clinical procedures developed by the Laboratory of Clinical Investigations, NIAID, for use in human volunteer work and conventional serologic methods employed in virus research.

Major Findings: It was reported last year that SV_{40} virus, present as a contaminant in a pool of RS virus, was inoculated by the respiratory route into 35 adult volunteers. None of the test subjects developed clinical signs or symptoms attributable to SV_{40} infection, but SV_{40} virus was recovered on days 7 and 11 from throat swabs of 3 of the volunteers; moreover, 22 of the test subjects developed, in the 3 weeks following inoculation, SV_{40} neutralizing antibody in titers ranging from 1:5 to 1:80. Results of this study are reported in detail in the publications listed in Part B.

Six of the volunteers have been under continuous medical surveillance since their virus exposure in June or September, 1960. Except for an occasional respiratory illness, all have remained well. Four of the 6 possessed measurable amounts of SV_{40} neutralizing antibody when last tested 6-9 months after inoculation. The 2 persons

whose antibody had been low at 3 weeks, no longer had detectable antibody at 9 months.

Significance to Biomedical Research and to the Program of this Division: SV_{40} virus has been a frequent contaminant of primate cell cultures used in the preparation of poliomyelitis and adenovirus vaccines. Consequently, elucidation of its pathogenic potential for man has been of special interest. The acute phase observations undertaken under this project have been terminated; however, the records of the volunteers are in the Clinical Center and periodic physical and serologic examination will continue for each of the 4 volunteers available for long term followup study.

Part B.

Included Yes X No

Part B. Honors, Awards, and Publications

Publications other than abstracts from this project:

Kravetz, H. M., Knight, V., Chanock, R. M., Morris, J. A., Johnson, K. M., Rifkind, D. and Utz, J. P.: Respiratory syncytial virus. III. Production of illness and clinical observations in adult volunteers. J.A.M.A., 176: 657-662, 1961.

Knight, V., Kapikian, A. Z., Kravetz, H. M., Chanock, R. M., Morris, J. A., Huebner, R. J., Smadel, J. E., Evans, H. E.: Ecology of a newly recognized common respiratory agent, RS virus. Ann. Int. Med. 55: 507-524, 1961.

Morris, J. A., Johnson, K. M., Aulisio, C. G., Chanock, R. M., Knight, V.: Clinical and serologic responses in volunteers given vacuolating virus (SV_{40}) by respiratory route. Proc. Soc. Exper. Biol. and Med. 108: 56-59, 1961.

Serial No. DBS 44

1. Laboratory of Virology and Rickettsiology
2. Sections on 1.) Respiratory Viruses and 2.) Enteric Virology and Rickettsiology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year
1961

Part A.

Project Title: Typhus vaccine - killed epidemic

Principal Investigator: Dr. J. Anthony Morris

Other Investigators: Mr. Calvin G. Aulisio, Miss Elizabeth B. Jackson, Dr. Joseph E. Smadel, Dr. C. L. Wisseman, Jr. (Maryland) and Dr. J. R. Kingston (Navy)

Cooperating Units: Department of Microbiology, University of Maryland Medical School; Bureau of Medicine, Department of the Navy

Man Years:
Total: 2
Professional: 1
Other: 1

Project Description:

Objectives: (1) To measure the antibody responses in animals and man to a single vaccine consisting of a mixture of 2 rickettsiae. (2) To determine the smallest antigenic mass required in a killed rickettsial vaccine to sensitize an individual to booster injection.

Methods: Standard procedures used in a research laboratory engaged in studies on rickettsiae.

Major Findings: Antibody responses in guinea pigs and man to combined epidemic and Q fever vaccine. A. Guinea pigs. The serologic response of a group of guinea pigs injected on days 0 and 7 with a vaccine consisting of equal parts of an experimental, concentrated, epidemic typhus vaccine (preparation described in 1960 report) and a Q fever vaccine (prepared by WRAIR) was compared with the response of other groups of guinea pigs receiving one or the other of the components. At 14 days after the second injection of the combined vaccine, the geometric mean epidemic typhus CF antibody titer was 525 or approximately 4 x the 128 value obtained in the guinea pigs vaccinated with the epidemic typhus component administered as a monovalent material. The geometric mean TN titer was 204 or 4 x the 58 value obtained in animals receiving the

monovalent epidemic vaccine. Thus, it appears that in guinea pigs the Q fever component in the combined vaccine enhanced the antigenicity of the epidemic factor in the combined vaccine. However there was little or no reciprocal effect: the geometric mean Q fever CF titer of 116 obtained in combined vaccine recipients was not significantly different from the 109 value obtained in animals vaccinated with the monovalent Q fever material.

B. Man-Medical Students. The vaccines used in the guinea pig work just described were also injected into volunteers by Dr. Wisseman. When administered in 1.0 ml amounts on days 0 and 7 as a combined vaccine (0.5 ml of typhus plus 0.5 ml of Q fever) to 23 individuals or as a monovalent material (0.5 ml of typhus) to 21 individuals, all recipients responded with development of typhus TN antibody and all but 3 made CF antibody. In contrast to the findings in guinea pigs there was no significant difference in the serum levels of typhus antibodies in the two groups. The mean CF and TN titers were 64 and 64 for those that received the typhus vaccine alone or in combination with Q vaccine.

C. Man-Marines. Groups of 75-100 Marines were given decreasing amounts of commercial epidemic typhus vaccine in order to determine the minimum quantity of antigen required to sensitize an individual so that he would respond in a booster fashion when reinoculated with a regular dose of vaccine. The standard immunization schedule of two 1.0 ml doses of vaccine administered on days 0 and 7 induced CF and TN antibodies in all 75 recipients. The following percentages of recipients responded with development of one or both CF and TN antibodies when injected with the indicated vaccine dilution: 92%, 1:4; 39%, 1:16; 37%, 1:64; 10%, 1:256. The fact that 10% of 75 individuals responded with development of detectable levels of antibody following inoculation of 1.0 ml of a 1:256 dilution of epidemic typhus vaccine is of interest.

Appropriate numbers of Marines from each of the groups just mentioned were given a dose of 0.5 ml of typhus vaccine six months after the original course. Studies are in progress to determine the serological response of these persons to the booster dose of vaccine.

Significance to Biomedical Research and the Program of the Division: Rickettsial diseases might well become of importance throughout the world following devastations such as might be brought about by nuclear attack. It is,therefore, of importance that steps be taken to produce and stockpile stable and potent rickettsial vaccines.

Proposed Course of Project: Work will be continued along the lines indicated above.

Part B.

Included Yes_____ No X

Serial No. DBS 45
1. Laboratory of Virology & Rickettsiology
2. Section on Respiratory Viruses
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Studies on respiratory viruses

Principal Investigator: Dr. J. A. Morris, Mr. C. G. Aulisio and Lt. Col. E. L. Buescher(WRAIR)

Cooperating Units: Department of Virus Diseases, Walter Reed Army Institute of Research

Man Years:
Total: 5/8
Professional: 1/8
Other: 1/2

Project Description:

Objectives: Development of simpler and more accurate procedures for measuring the antigenic potency of adenovirus vaccines.

Methods Employed: The hemagglutinating-inhibition antibody responses of guinea pigs immunized with decreasing amounts of adenovirus vaccines are being measured. The results of such observations are being compared with those obtained in tests employing the usual adenovirus potency test which is based on neutralization antibody response.

Major Findings: Guinea pigs vaccinated with formalin inactivated adenovirus vaccines developed serum levels of neutralizing and HAI antibodies of the same order of magnitude. The HAI antibody response in guinea pigs is specific: animals injected on days 0 and 7 with 0.5 ml amounts of bi-(types 4 and 7) or tri-(3,4 and 7) valent vaccines respond with development of antibodies directed against individual antigens contained in the inoculum. The specificity of the antibody responses observed in guinea pigs in our work with inactivated vaccines are like the specific responses recorded by Rosen for rabbits injected with suspensions of live adenoviruses.

In measuring the serologic responses of guinea pigs to adenovirus vaccines, determination of the HAI antibody level has marked advantages over measuring the neutralizing antibody titer. The HAI test is less

time consuming (1 day vs 3-5 days). It eliminates the use of tissue cultures and, finally, the reproducibility of the HAI test with adenovirus antisera appears to be somewhat more consistent than that obtained in tissue culture neutralization tests with such materials. It would seem, therefore, that Rosen's HAI technique for measuring adenovirus antibody provides an accurate and reliable procedure in determining antigenic potency of adenovirus vaccines.

Significance to Biomedical Research and the Program of the Division. Continued improvement of the methods to provide reproducible quantitative assays of antigenic potency is essential in the biologic control of adenovirus vaccines.

Proposed Course of Project: Studies will continue to be directed toward a) improvement of methods to quantitate the antigenic content of adenovirus vaccines and b) correlation of the values obtained in assay procedures with the efficiency of the vaccines in inducing antibodies and resistance to disease in man.

Part B. Included Yes_____ No X

Serial No. DBS 46
1. Laboratory of Virology & Rickettsiology
2. Section on Virus Biology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Studies on antimicrobial activity of preparations from abalones and oysters

Principal Investigator: Dr. Chen Pien Li

Other Investigators: Dr. Benjamin Prescott, Dr. Albert I. Holtz, Dr. Caspar W. Hiatt, Mr. Raoul J. Benoit, Miss Elizabeth B. Jackson, Mr. William G. Jahnes and Mr. Elmer C. Martino

Cooperating Units: Laboratory of Bacterial Chemistry (NIAID)
Laboratory of Biophysics and Biochemistry

Man Years: (calendar year 1961)
Total: 6
Professional: 1
Other: 5

Project Description:

Our previous work on antimicrobial activity of abalone juice has been summarized in other annual reports and in the publications listed under Part B. Early this year we shifted our interest from abalone to oyster because the latter is more readily available. Nevertheless, some additional observations were made on abalone material.

Our early work demonstrated that canned abalone juice possessed antiviral activity. The question which naturally arose, was, what actually is abalone "juice"? Inspection of an abalone fishery in California revealed that "juice" consisted for the most part of blood and tissue fluids which oozed out of the abalone when it was cut into pieces before further processing. Fresh blood was then secured from live abalone in California and was found to possess antimicrobial activity similar to that of the canned abalone juice. Moreover, an antiviral fraction has also been isolated from canned abalone meat

Serial No. DBS 46
1. Laboratory of Virology & Rickettsiology
2. Section on Virus Biology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Studies on antimicrobial activity of preparations from abalones and oysters

Principal Investigator: Dr. Chen Pien Li

Other Investigators: Dr. Benjamin Prescott, Dr. Albert I. Holtz, Dr. Caspar W. Hiatt, Mr. Raoul J. Benoit, Miss Elizabeth B. Jackson, Mr. William G. Jahnes and Mr. Elmer C. Martino

Cooperating Units: Laboratory of Bacterial Chemistry (NIAID)
Laboratory of Biophysics and Biochemistry

Man Years: (calendar year 1961)
Total: 6
Professional: 1
Other: 5

Project Description:

Our previous work on antimicrobial activity of abalone juice has been summarized in other annual reports and in the publications listed under Part B. Early this year we shifted our interest from abalone to oyster because the latter is more readily available. Nevertheless, some additional observations were made on abalone material.

Our early work demonstrated that canned abalone juice possessed antiviral activity. The question which naturally arose, was, what actually is abalone "juice"? Inspection of an abalone fishery in California revealed that "juice" consisted for the most part of blood and tissue fluids which oozed out of the abalone when it was cut into pieces before further processing. Fresh blood was then secured from live abalone in California and was found to possess antimicrobial activity similar to that of the canned abalone juice. Moreover, an antiviral fraction has also been isolated from canned abalone meat

As reported previously, two fractions, one antibacterial and the other antiviral, have been isolated from abalone material and designated as paolin I and paolin II respectively. Both were tested for their effect on the growth of Rickettsiae prowazeki in the yolk sac of embryonated eggs by a standard procedure. Paolin I had a slight rickettsiostatic effect at the maximum nontoxic dose, while paolin II had no effect.

Our work on in vivo antibacterial activity of paolin I has not been completed; it was temporarily suspended while attention was concentrated on antiviral aspects of the project.

Crude oyster extract and its fractions isolated by ion exchange chromatography showed activity similar to that of abalone material against influenza or poliomyelitis virus in tissue culture or in mice. Perhaps more interesting was the isolation of an antiviral fraction in large quantities from oysters by treating them with acetic acid. The product was a whitish powder readily soluble in water. When monkey kidney tissue cultures were treated with this fraction at 50 mg.% concentration for 24 hours prior to infection, multiplication of poliovirus was inhibited with 10 to 100-fold reduction in titer of virus. Preliminary experiments also indicated that the oyster preparation induced a certain amount of resistance to experimental poliomyelitis and influenza in mice. The oyster powder is being further purified.

Part B.

Included Yes X No

Part B. Honors, Awards, and Publications

Publications other than abstracts from this project:

Prescott, B. and Li, C. P.: Abalone juice. Fractionation and antibacterial spectrum. Proc. Soc. Exper. Biol. & Med. 105: 498-500, 1960.

Li, C. P., Prescott, B. and Jahnes, W. G.: Antiviral activity of a fraction of abalone juice. Proc. Soc. Exper. Biol. & Med., in press.

Serial No. DBS 47

1. Laboratory of Virology & Rickettsiology
2. Section on Experimental Virology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Influenza viruses

Principal Investigator: Dr. Bernice E. Eddy

Other Investigators: None

Cooperating Units: None

Man Years: (calendar year 1961)

Total: 1-1/8
Professional: 1/8
Other: 1

Project Description:

Objectives: The objectives of the project were to control and improve influenza virus vaccines and to improve methods for evaluating the safety, purity and potency of the product.

From January 1 to July 1, 1961, 43 lots of influenza virus vaccines or influenza virus vaccines combined with adenovirus vaccines were submitted for release. See list of control work.

Major work on the project. A. Potency tests on influenza virus vaccines. Potency tests for measuring the antigenic activity in mice were performed on 33 lots of influenza virus vaccines or the influenza virus components of combined influenza virus and adenovirus vaccines. Two lots of concentrated monovalent vaccine for export were tested by another method.

B. Hemagglutination-inhibition as a measure of antigenicity induced by vaccines. Although the standard mouse antigenic test is a reliable and reproducible test, considerable time is required to carry it out. In times of epidemics, a less reliable test would be justified and such a test was being investigated. Vaccines were tested

with the following influenza virus strains: 37 lots with PR8, Asian and Ann Arbor strains, 33 lots with the Great Lakes strain, 3 lots with the Swine and Lee strains and 4 lots with a strain related to the Asian strain.

C. Studies on the antigenicity of current influenza virus strains. Because the antigenic composition of influenza virus strains that cause disease change every few years, a constant check on the strains currently causing diseases was made and compared to the strains in the vaccines. During the first half of 1961, the following new virus strains were investigated, one strain each from England, Japan, and New York and two strains from Washington.

The investigative work under this project was discontinued on July 1, 1961 when the principal investigator assumed the position of Chief of the Section on Experimental Virology. The pathologic control work on influenza remained in the Section on Respiratory Viruses.

Part B included: Yes_____ No x

Serial No. DBS 47

Control work January 1 - July 1, 1961

Bernice E. Eddy, Ph.D.

Influenza virus vaccines submitted

Civilian formula, four virus strains	18 lots
Combined adeno and influenza four virus strains of influenza	11 lots
Monovalent concentrates for export	2 lots
Military formula, six virus strains	12 lots
	43 lots
Released by July 1, 1961	33 lots

Adenovirus vaccines submitted

Civilian formula, three virus strains	12 lots
Combined influenza and adeno, three virus strains of adeno	11 lots
Military formula,two virus strains	2 lots
	25 lots

Released by July 1, 1951

Official tests completed for influenza virus strains

PR8	31 lots
Asian	23 lots
Ann Arbor	31 lots
Great Lakes	31 lots

Tests completed on adenovirus strains

Type 3	12 lots
Type 4	14 lots
Type 7	14 lots

Tests were underway on July 1, 1961 on 10 lots of influenza virus vaccines.

In addition, assay work was done on adenovirus vaccines for use as a reference standard and sensitivity tests were carried out on 3 lots of cell cultures used for safety tests of adenovirus vaccines.

Serial No. DBS 48

1. Laboratory of Virology & Rickettsiology
2. Section on Experimental Virology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Adenoviruses

Principal Investigator: Dr. Bernice E. Eddy

Other Investigators: None

Cooperating Units: None

Man Years: (calendar year 1961)

Total: 7/8
Professional: 1/8
Other: 3/4

Project Description:

Objectives. The objectives of the project were to control and improve adenovirus vaccines and to improve methods for evaluating the safety, purity and potency of the product.

Adenovirus vaccines have been of special interest to the military since new troops are particularly susceptible to adenovirus infections. During 1960 and 1961 there was an interest in adenovirus vaccines for the civiliam population, particularly adenovirus vaccines combined with influenza virus vaccines. During the first half of 1961, 25 lots of adenovirus vaccines or adenovirus vaccines combined with influenza virus vaccines were submitted for release. See list of control work. Two problems arose in regard to the adenovirus vaccines. 1) Potency for some lots of vaccine, particularly for type 7, were low or borderline. 2) A simian virus, known as SV_{40}, was found by Dr. Gerber to be resistant to formaldehyde and was not inactivated by the manufacturing process. Beginning May 1961, adenovirus vaccines were not released if viable SV_{40} was found in them.

Major work on the project. A. Potency of adenovirus vaccines for type 3, 4 and 7. Work on different methods for determining the potency of adenovirus vaccines was continued. One method, involving the immunization of guinea pigs and the use of their sera in a serum-virus neutralization test in known numbers of HeLa cells, was used to test adenovirus vaccines submitted for release.

B. Studies of susceptibility of tissue culture cells for the adenoviruses. These studies were of importance in safety tests of adenovirus vaccines. Three lots of Hep 2 cells used for testing the safety of adenovirus vaccines were tested for sensitivity.

C. Reference vaccine. Monovalent vaccines for types 3, 4, and 7 were obtained and pooled (by Dr. Seligmann) according to a prescribed formula. The potency of the pooled vaccine was compared to the current lot of vaccine being used as a reference.

D. Purity. In previous experiments aimed at determining the presence of contaminating viruses in monkey kidney tissue cultures, the cultures used for the production of adenovirus vaccines, also polio vaccines, extracts of the cell cultures were found to induce tumors in hamsters. During 1961, this work was extended and the tumor-inducing "substance" in the cell extract was identified as SV_{40}. See tumor viruses.

E. Studies on the antigenicity of current adenovirus strains. The antigenicity of three recently isolated strains of type 7 adeno-virus were investigated to determine if they differed from the type 7 strain used in the vaccine. Type 7 potency was low in some of the lots of vaccine submitted for release during the first half of 1961.

The investigative work under this project was discontinued on July 1, 1961 when the principal investigator assumed the position of Chief of the Section on Experimental Virology. The pathologic control work on adenoviruses remained in the Section on Respiratory Viruses.

Part B.

Included Yes_____ No x

Serial No. DBS 49
1. Laboratory of Virology & Rickettsiology
2. Section on Experimental Virology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Pneumococci

Principal Investigator: Dr. Bernice E. Eddy

Other Investigators: None

Cooperating Investigators: None

Man Years: (calendar year 1961)

Total:
Professional: insignificant

Project Description:

Objectives. The objective of the project is to control pneumococcus typing sera. This is a minor project; only 6 lots of pneumococcus typing sera were released in 1961.

The major aim of the project is to fulfill the obligation of controlling pneumococcus typing sera.

Part B.

Included Yes_____ No X

Serial No. DBS 50
1. Laboratory of Virology & Rickettsiology
2. Section on Experimental Virology
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Tumor viruses

Principal Investigator: Dr. Bernice E. Eddy

Other Investigators: None

Cooperating Units: None

Man Years: (calendar year 1961)
Total: 2 3/4
Professional: 3/4
Other: 2

Project Description:

Objectives: This project was started several years ago in an effort to gain information on the etiology of lung cancer and as a sideline in investigations of known respiratory viruses. The original objective was to isolate a virus or viruses from human neoplasms and to find a way to prevent neoplasms in man.

The work on tumor viruses has had a definite bearing on biologics standards. In an investigation of the purity of adenovirus vaccines, and also poliovirus vaccines, a hamster tumor-inducing virus was demonstrated in rhesus monkey kidney cell cultures, the cultures used to manufacture vaccines. This virus has been identified as SV_{40}, a stable DNA virus that is present in the kidneys of many rhesus monkey kidney cultures and that contaminates most of the seed viruses grown in such cultures.

The work is of widespread interest for two reasons. 1) Although the virus has not been correlated with the occurrence of tumors in man, the possibility has not been ruled out either and the safest procedure has been to eliminate it from all adeno and poliovirus vaccines, a difficult task. 2) The natural host, the monkey, is nearer to man

in the biological scale than the hosts of most of the well known animal tumor viruses and its properties might be expected to be more like a human tumor virus, if such exists.

The aim of the project at present will be to continue to study this tumor virus in an effort to obtain any information that may be useful.

Part B.

Included: Yes x No

Part B.

Leuchtenberger, R., Leuchtenberger, C., Stewart, S. E., and Eddy, B. E.: Difference in host cell relationship between tubular epithelium and stroma in kidneys of mice infected with SE polyoma virus. A correlated cytological, histological, and cytochemical study. Cancer 14(3): 567, May-June 1961.

Eddy, B. E., Borman, G. S., Berkeley, W. H., and Young, R. D.: Tumors induced in hamsters by injection of rhesus monkey kidney cell extracts. Proc. Soc. Exper. Biol. and Med. 107: 191-197 , 1961.

Serial No. 51

1. Laboratory of Virology & Rickettsiology
2. Virus Biology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: The etiology of the sarcomas associated with the cyst walls of Cysticercus fasciolaris in rat livers

Principal Investigator: Dr. Lawrence Kilham

Other Investigators: Dr. Louis J. Olivier

Cooperating Units: Laboratory of Parasitic Diseases(NIAID)

Man Years: None (calendar year 1961)

Project Description:

Dr. Kilham has left the NIH and the project has been discontinued.

Part B.

Included Yes_____ No X

Serial No. DBS 52
1. Laboratory of Virology & Rickettsiology
2. Virus Biology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Latent infections and the pathogenesis of rat virus (RV) infections in hamsters and in multimammate rats

Principal Investigator: Dr. Lawrence Kilham

Other Investigators: None

Cooperating Units: None

Man Years: None (calender year 1961)

Project Description:

The work has been completed and the project has been terminated. The objectives and methods are described and the findings are given in the publications listed in Part B.

Part B.

Included Yes X No

Part B. Honors, Awards and Publications

Kilham, L.: Mongolism associated with rat virus (RV) infection in hamsters. Virology 13: 141-142, 1961.

Kilham, L.: Rat virus (RV) infections in hamsters. Proc. Soc. Exper. Biol. & Med. 106: 825-829, 1961.

Serial No. DBS 53
1. Laboratory of Virology & Rickettsiology
2. Virus Biology Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: The potentiating effect of latent trichinosis in rats on infection and disease due to EMC-virus

Principal Investigator: Dr. Lawrence Kilham

Other Investigator: Dr. Louis J. Olivier

Cooperating Units: Laboratory of Parasitic Diseases, NIAID

Man Years: None (calendar year 1961)

Project Description:

The work has been completed and the project has been terminated. The objectives and methods are described and the findings are given in the publication listed in Part B.

Part B.

Included Yes X No

Part B. Honors, Awards and Publications

Kilham, L. and Olivier, L. J.: The promoting effect of trichinosis on encephalomyocarditis (EMC) virus infection in rats. Am. J. Trop. Med. & Hyg., 10:879-884, 1961.

Serial No. DBS- 54
1. Laboratory of Biophysics and Biochemistry
2. Research Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Studies of the inactivation of viruses.

Principal Investigators: C. W. Hiatt, Ph.D., Jerome J. Helprin, Ph.D., and Dorothy Moore, B.A.

Other Investigators: Paul Gerber, Ph.D.

Cooperating Units: Section on Tissue Culture and Test Development, LVI, DBS.

Man Years:
Total: 4.00
Professional: 3.00
Other: 1.00

Project Description:

Objectives: (1) To gain information about the fundamental nature of the various biological properties of viruses through studying the mechanisms of inactivation of these properties by physical and chemical agents.

(2) To develop an understanding of processes of inactivation that may be applied to the preparation of viral vaccines.

Methods Employed: Various animal and bacterial viruses are cultivated in cell cultures and the infective fluids from these subjected to treatment with graded doses of the inactivating agent. Samples taken at the different dosage levels are assayed for infectivity, and the kinetic relationship between dose and survival ratio is established. From the characteristics of the survival curve inferences are drawn about the properties of the virus and the mechanism of the inactivating process.

Major Findings: (1) Differential inactivation of simian viruses in suspensions of live poliovirus. Earlier experiments had indicated that selective photosensitization with thiazine dyes could be used as a means for differential inactivation of certain simian viruses present as contaminants in live ~~polio~~ poliovirus vaccine. Simian virus 40, (the "vacuolating agent" of Sweet and Hilleman) is frequently found in poliovirus suspensions harvested from rhesus monkey kidney cell cultures and tends to persist in the suspension because its thermostability at neutral pH exceeds that of poliovirus itself. Photodynamic inactivation of SV_{40} by exposure to visible light in the presence of toluidine blue (6 mcg/ml) proceeds at a rapid rate. Survival ratio (N/N_o) as a function of time (t) is given by the expression:

$$\text{probit } \frac{N}{N_o} = 4.96 - 2.10 \log t$$

at a total visible light intensity of 1 watt/cm^2. The data indicate that a survival ratio of 10^{-5} is readily obtained, and that survival ratios of 10^{-7} or less may be attained without significant loss of infectivity of the poliovirus component. Continuous-flow apparatus utilizing a 1500 watt incandescent light source has been used to obtain survival ratios of less than 10^{-5} for SV_{40} at a flow rate of 150 ml/min.

(2) Photosensitization of poliovirus. When poliovirus is cultivated in the dark in rhesus kidney cell cultures containing proflavine at a concentration of 2 mcg/ml, the new virus produced becomes photosensitive, presumably because of incorporation of proflavine into the structure of poliovirus RNA (as demonstrated by Schaffer). Irradiating the progeny virus with polychromatic visible light at an intensity of 1 watt/cm^2 rapidly destroys its infectivity; less than 1 particle out of 10^5 survives a five minute exposure under these conditions. This technique makes it convenient to discriminate between parent and progeny virus and facilitates the quantitative study of virus replication within the cell. The photosensitivity conferred upon the virus by proflavine is a durable phenotypic tag that may be useful in various tracer experiments.

(3) Photodynamic inactivation of SV_{40} in rhesus kidney cell cultures. Experiments were performed to test the feasibility of inactivating SV_{40} in cell cultures prior to use of these cultures in propagating or assaying other viruses. The endogenous SV_{40} content of suspended rhesus kidney cells immediately after trypsinization was below ordinary limits of detection, but when these cells were cultivated in monolayers in maintenance medium for one week, 70% of the preparations were found to contain SV_{40}. When the medium was replaced and the new medium tested after incubation for an additional 4 days it contained $10^{3.5}$ to 10^6 $TCID_{50}$ /0.1 ml in those cultures which were positive. This

degree of contamination of blank medium was taken to represent the maximum which would have occurred if the cells had been used during the last 4 days to propagate poliovirus.

When 0.1 ml of sterile Toluidine Blue solution (0.1 mg/ml) was added to each newly initiated 2-oz. bottle containing 6 ml of cell suspension, and the bottles were irradiated with bright visible light for varying periods of time, a considerable suppression of SV_{40} could be demonstrated, but the blank medium in contact with the cells during the last 4 days always contained detectable SV_{40} if the virus was initially present. In several experiments, cell cultures which had been irradiated for 10-minute intervals on each of the first 4 days after initiation were subsequently inoculated with poliovirus. The harvested poliovirus from irradiated bottles contained less than 1% of the infective SV_{40} found in parallel control bottles which had received no irradiation, but in no instance was SV_{40} completely eradicated from the culture by this treatment.

(4) Classification of animal viruses by photodynamic inactivation rates. The characteristic velocity constant for inactivation by visible light in the presence of Toluidine Blue had previously been shown to correspond approximately with accepted taxonomic groupings for animal viruses. Recent findings have emphasized the potential value of this process as an aid in classification. Reovirus (ECHO-10), for example, is rapidly inactivated, confirming that it is different from other members of the ECHO group which are very slowly inactivated. Simian viruses 16, 18, and 19 are slowly inactivated, whereas SV 1, 5, 6, 12 and 15 are rapidly destroyed. The procedure for performing inactivation experiments for classification purposes has been simplified and standardized to make it satisfactory for general laboratory use.

Significance to the Program of DBS. The continued investigation of the mode of action of viral inactivating processes is expected to contribute to the fundamental basis for control of viral vaccines.

Proposed Course of Project. This project will be continued.

Part B included Yes /__/ No /X/

Serial No. DBS-55
1. Laboratory of Biophysics and Biochemistry
2. Research Section
3. Bethesda, Md.

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: Physical and chemical characterization of viruses.

Principal Investigators: John F. Thiel, B.A., Raoul J. Benoit, Jr., M.S.

Other Investigators: None

Cooperating Units: None

Man Years:
Total: 0.75
Professional: 0.75
Other: 0

Project Description:

Objectives: To obtain information about the physical dimensions and chemical composition of animal viruses and to correlate this information with biological properties.

Methods Employed: Standard methods of physical and chemical analysis, including ultracentrifugation and electron microscopy, are supplemented by specialized techniques for concentrating and purifying viruses.

Major Findings: (1) Determination of sedimentation constant from infectivity measurements. An ultracentrifuge rotor carrying six cells has been used to study different virus preparations in order to obtain sedimentation constants for the infective particles. The sector-shaped cells, with partitions at varying distances from the center of rotation, were filled with fluid containing the virus and centrifuged at a selected speed for a given length of time. The material above each partition was then removed and assayed for infectivity in comparison with the uncentrifuged preparation. If the sample taken from above the partition showed

a 95% or greater loss in infectivity, the sedimenting boundary was assumed to have passed the barrier. From the radial distance of the pair of partitions which bracketed the position of the boundary, limiting values of the sedimentation constant could be calculated. Experiments with the common bacteriophages have made it clear that there are some major difficulties associated with this technique. One of the sources of error is adsorption of virus upon the inside surfaces of the cell. This difficulty is reduced in magnitude if Lucite instead of quartz is used for the cell windows. Variations in procedure, including the use of zone centrifugation in density gradients, are presently under investigation as alternative methods for determining sedimentation constants of newly isolated viruses.

(2) Preparation of viruses for electron-microscopy. A modification of the agar-diffusion technique of Taylor and McCormick has been developed to facilitate electron microscopic observation of animal viruses available in low concentration in tissue culture fluids. After centrifugation at low speed to remove cell debris, the fluid is placed in a plastic tube containing an agar gel. The tube and contents are centrifuged at high speed in a swinging-bucket rotor in the ultracentrifuge causing the virus particles to be deposited upon the agar surface. The tube is cut open, the agar block removed, and its exposed surface coated with a collodion suspension. After drying, the collodion film is removed from the agar block by floating in water. Electron microscope grids are deposited upon the film and shadowed with metal to permit the examination of the replica of the virus which had been deposited upon the agar.

Significance to the Program of DBS. The development of methods for rapid characterization of newly isolated viruses will assist in the testing of viral vaccines for safety, purity, and potency.

Proposed Course of Project: This project will be continued.

Part B included Yes /__/ No /X/

Serial No. 56
1. Laboratory of Blood & Blood Products
2. Blood & Blood Derivatives, Diagnostic Reagents
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Development and Application of Control Procedures for Blood and Blood Products.

Principal Investigator: Dr. John T. Tripp

Other Investigators: Dr. David L. Aronson
Dr. J. N. Ashworth
Dr. Richard N. Aster
Miss Joan F. Bennett
Dr. William R. Bronson
Miss Marietta Carr
Miss Ann L. Dayton
Mrs. Eleanor G. Morrison
Mr. Robert C. Scheno
Dr. Mitsuo Yokoyama

Cooperating Units: None

Man Years:
Total: 3.0
Professional: 2.0
Other: 1.0

Patient Days: None

Project Description:

Objectives: To develop improved control procedures and standards by evaluating present control procedures and manufacturing methods as these affect the safety, purity and potency of biological products derived from blood.

Methods Employed: (a) Samples of biological products derived from blood are sent as unknowns to manufacturers or blood banks for comparative testing to check new methods and reagents as well as standard techniques currently in use.

(b) Colored photographic slides of agglutination reactions are interpreted on a voluntary basis by blood bank technicians as a study of blood banking errors. The technicians record their results in different ways, utilizing forms supplied by this Laboratory as well as on the routine forms used in their laboratory.

(c) Bacterial contamination in blood and derivatives of blood is being investigated in two ways. First, in an attempt to determine the mode of action of bacteriological filters, the filter medium is immobilized in collodion to allow thin sections to be taken for microscopic examination. Second, the contamination rate in bank blood collected in a closed system following various preparations of the site of phlebotomy is being studied.

(d) Containers for the shipment of blood and other products requiring continuous storage at uniform low temperatures are being investigated as to their efficiency and usefulness in this important aspect of the preservation of biologicals. Information is obtained under static laboratory conditions as well as during actual shipment.

(e) Infrared spectrometry is being utilized to determine changes occurring in plastic blood containers resulting from age, temperature and humidity.

(f) The technique of immunoelectrophoresis is being modified and developed to increase the usefulness of this important method in the study of antibody-antigen proteins.

(g) The mechanism of action, the standardization and the clinical significance of tests utilizing "broad spectrum" and "non-gamma" anti-human serum reagents are being studied.

(h) Red blood cells are being used as a model system in a study of methods of drying labile biological materials.

(i) Physical chemical and serological tests, not routinely performed, are being adapted and applied to blood, red blood cells and fresh plasma in a study to develop new control tests for these products for incorporation into standards.

Major Findings: (a) The evaluation of methods of testing used in blood banks is of continuing interest, but no studies were carried out during the past year.

(b) The part of the study of possible sources of blood banking errors involving the voluntary cooperation of blood bank technicians has been completed. The tabulation and analysis of about 40,000 readings made by about 100 technicians is continuing.

(c) In the investigation of bacteriological filters, there have been no results of significance. The study of methods of preparing the site of phlebotomy has just been started and special blood collection equipment for use in this study has been designed.

(d) Various shipping containers from different sources continue to be evaluated in a continuing search for improvements. Special attention is being given to portable containers utilizing self-contained mechanical refrigeration.

(e) The investigation of changes in plastic equipment has been discontinued without results of significance. This important project will be resumed when staff time is available.

(f) Immunoelectrophoresis in two directions has produced patterns with more detail than with earlier techniques. A report has been prepared for publication.

(g) The study of more specific anti-human serum has just been started.

(h) Some success has been achieved in the maintenance of antigenic properties of red blood cells that have been dried and then reconstituted.

(i) Preliminary data has been collected on new control tests for blood bank products. This information is being evaluated to determine the future course of the study.

Significance of Research:

Control procedures of greater significance and specificity can result from investigations such as those carried out as part of this project.

Proposed Course of Project:

The various active parts of this project will continue along the same lines.

Part B included Yes /X/ No / /

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B. Honors, Awards and Publications

Publications other than abstracts from this project:

Yokoyama. M. and Finlayson, J. S. Effects of Salt Concentration, pH. and Certain Ions on the Agglutination of Human Erythrocytes by Isohemagglutinins. Transfusion, 1. 175-180, 1961.

Yokoyama, M., Finlayson, J. S., Suchinsky, R. T. and Roberts, N. E. Chemical and Serological Characteristics of Blood Group Antibodies in the ABO and Rh Systems. The Journal of Immunology, 87, 56-63, 1961.

Serial No. 57

1. Laboratory of Blood & Blood Products
2. Blood & Blood Derivatives
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Stability and Potency of Blood Fractions

Principal Investigator: Dr. John T. Tripp

Other Investigators: Dr. David L. Aronson
Dr. J. N. Ashworth
Miss Ann L. Dayton
Mr. Paul O. Fehnel
Dr. John S. Finlayson
Dr. Youichi Ichikawa
Dr. Edward H. Mealey
Dr. Michael W. Mosesson

Cooperating Units: None

Man Years:
Total: 5.6
Professional 3.4
Other: 2.2

Patient Days: None

Project Description:

Objectives: To delineate the changes occurring in the physical and chemical properties of various human plasma proteins resulting from the physical and chemical treatment incidental to processing and to investigate the properties, the mechanisms of action.

Methods Employed: (a) Parallel samples of liquid and dried Normal Serum Albumin (Human) are stored at 32°C., 5°C. and ambient room temperature. At regular intervals, the samples are tested for stability by viscosity determinations. ultracentrifugation, electrophoresis and nephelometry.

(b) In order to study the effects of physical and chemical treatment of plasma and plasma derivatives, these products are being subjected to heating at 60°C., ultraviolet irradiation and long term storage in containers of various materials and surfaces. Column chromotography, with continuous pH and ionic strength gradient election is being utilized to separate fractions of the proteins following treatment. These fractions are then studied by ultracentrifugation and by other tests to determine the nature of any changes in the protein molecules.

(c) Changes in biologic activity at oil-water interfaces of several components of the coagulation system are being investigated as an aid to gaining further insight into the nature of the blood clotting mechanism.

(d) The sensitivity of dried proteins to ionizing radiation appears to be a direct function of molecular size. This method, utilizing low voltage election irradiation, is being utilized to study molecular weights of impure components of the blood coagulation system.

(e) The purification and characterization of components of the coagulation system is an important long term project designed to yield more fundamental information concerning this complex biological system. Any procedure capable of application to these aims is being employed. Particular emphasis is being placed on column chromatography and fractional precipitation.

Major Findings: (a) Periodic routine stability measurements have been continued during this, the seventh year of the study. The small but definite changes observed in previous years in albumin stored at temperatures over 5°C. continue to be noted. No evaluating has been attempted of the effect of these changes on the clinical usefulness of albumin.

(b) In the study of the effects of physical and chemical factors on plasma and plasma derivatives, the use of cellulose chromatography gives well defined, reproducible results. The method makes it possible to detect changes in proteins not readily found by other techniques.

(c) The study of clotting factors at oil-water interfaces has been held in abeyance pending further work on the preparation of purified components.

(d) The target volume method of determining molecular weight has not been utilized to a great extent this year. Further studies were done on porcine and human antihemophilic globulin resulting in a revision of the estimated molecular weight upward to the region of 180,000.

(e) Further work has been done on the physical chemical properties of a plasminogen-free human fibrinogen. A report on the preparation of this protein is in press. Work continues on the purification of human prothrombin and the mechanism of its conversion to thrombin. Some success has been achieved in the preparation of a pure stable plasminogen which is soluble near neutral pH.

Significance of Research:

All blood and blood products controlled by the Division of Biologics Standards are required to be stable and potent. Improved methods for the evaluation and assay of these characteristics in vitro increase our ability to determine stability and potency and to place these control functions on a foundation based on fundamental knowledge of the properties of these products.

Proposed Course of Project:

The various parts of this project will be continued.

Part B included Yes / / No /X /

Serial No. 58

1. Laboratory of Blood & Blood Products
2. Blood Bank
   Blood & Blood Derivatives
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Development and Application of Immunohematological Research Procedures.

Principal Investigator: Dr. William R. Bronson

Other Investigators: Dr. Richard N. Aster
Miss Marietta Carr
Dr. Harvey E. Cooper
Dr. John S. Finlayson
Mrs. Mary McGinness
Mrs. Dorothy Singer
Dr. Mitsuo Yokoyama

Cooperating Units: None

Man Years:
Total: 2.6
Professional: 2.1
Other: .5

Patient Days: None

Project Description:

Objectives: The objectives of this project are to search for the rare antibodies to the human blood factors which result from the antigenic stimulus of pregnancy, transfusion or natural exposure; to develop better methods for this work and to judge its applicability to clinical and laboratory medicine.

Methods Employed: (a) A survey of genotypes and antibodies occurring in specific population groups and patients is being carried out by testing blood samples from random blood donors. transfusion recipients, anthropological and disease groups as well as patients presenting specific problems. Techniques used include those under development in this Laboratory as well as those exchanged with other workers.

(b) Immunohematological studies are being made of interesting specific examples selected from the above screening procedure. The aim is to make recommendations for specific therapy in individual cases and to obtain background information which is used in the control of biologicals. Serological methods are correlated whenever possible with clinical experiments

in sensitized subjects.

(c) Rabbits and chickens are being used for the production of antisera to rare blood group antigens. These antisera are studied by electrophoretic methods in addition to absorptive, elution and inhibition techniques.

(d) A study of the varying abilities of animals to produce anti-human serum is being carried out by immunization with differing human sera and by differing methods. The animal sera have been studied by immunophoresis.

(e) Blood from donors associated with cases of hepatitis is collected and screened by available liver function tests in a study attempting to give information leading to the control and prevention of hepatitis among transfused patients.

(f) The development of testing methods for leukocyte and platelet antibodies and the study of their etiologic roles in non-hemolytic transfusion reactions are in progress. These methods are used to obtain compatible donors for individuals refractory to leukocyte or platelet transfusion therapy.

(g) There is evidence that formed elements and other components of blood can be separated in a completely closed system by use of high intensity magnetic fields. The design and operation of equipment to separate red cells, platelets and plasma by magneto-electrophoresis is being investigated.

Major Findings: (a) Screening of interesting blood samples from various sources has continued. Over 1800 complete genotypes have been performed on anthropological and disease groups and on other blood samples to establish the incidence and mode of inheritance of blood antigens.

(b) Interesting cases discovered during the screening of blood samples have been studied intensively. In many cases, this has lead to specific recommendations applicable to the selection of compatible blood for transfusion.

(c & d) The studies of the production of specific antisera to blood group antigens and the varying abilities of animals to produce anti-human sera have been concluded because of the resignation of the interested staff members. Reports are being prepared for publication.

(e) Data on hepatitis cases continues to be collected but no conclusions can be drawn from the information available so far.

(f) The investigations of leukocyte and platelet antibodies have been undertaken within the past few months. As yet, no experimental results are available.

(g) Several trials of the separation of the formed elements of blood by a magnetoelectrophoresis method have been carried out with very promising

results indicating that this technique is feasible.

Significance of Research:

The transfusion of blood from one person to another, although performed over 6,000,000 times per year in the U. S. alone, is a unique example of biological exposure to foreign antigens. Knowledge of the effects to be expected from these transfers can assist this Division in determining the safeguards to be applied through licensure.

Proposed Course of Project:

It is expected that this project will be continued along the same lines.

Part B included Yes /X / No / /

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B. Honors, Awards and Publications

Publications other than abstracts from this project:

Yokoyama, M., Solomon, J. M., Kuniyuki, M. and Stroup, M. $\bar{\bar{R}}^{o}$ (D--) in Two Japanese Families with a Note on its Genetic Interpretation. Transfusion, 1, 273-279, 1961

Kliman, A., Schmidt, P. J., Hoye, R. C. and Stohlman, F. Jr. Survival of Chromium ^{51} Labeled Red Cells in the Presence of Anti-H and Anti-A_1. Transfusion, 1, 40-43, 1961.

Serial No. 59

1. Laboratory of Blood & Blood Products
2. Blood Bank Section
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: Stability and Potency of Formed Blood Elements.

Principal Investigator: Dr. William R. Bronson

Other Investigators: Dr. Richard N. Aster
Dr. Harvery E. Cooper
Dr. Allan Kliman
Mrs. Mary McGinness
Dr. Paul J. Schmidt

Cooperating Units: National Cancer Institute

Man Years:
Total: 1.1
Professional: 1.1
Other: 0.0

Patient Days: None

Project Description:

Objectives: To establish standards of potency for the antigenicity and viability of the formed blood elements.

Methods Employed: (a) Erythrocytes with the Rh_o variant (D^u) blood factor are being tested for antigenicity by transfusion to females over 50 years of age and to males who are receiving transfusions as part of their prescribed therapy. Differential agglutination techniques are employed in following the survival of the transfused cells. Antibody screening and identification are being carried out.

(b) A program to study the use of platelet transfusion in thrombocytopenic states in leukemia employs platelet concentrates and platelet rich plasma in large doses. The effect on the recipient's platelet count and on his clinical course is studied. The effects of donating platelets at frequent intervals are studied by detailed repetitive tests on the donor's blood. A similar program using leukocytes in leukopenic states is being investigated.

(c) Liquid nitrogen storage of red blood cells, white cells and platelets is being investigated to determine the effects of storage at this low temperature on measurable characteristics of these formed elements

of blood.

(d) Red cells having rare phenotypes are being collected and stored at subzero temperatures for transfusion when needed. The glycerol method of frozen storage is used. This study yields clinical information to complement the more elaborate laboratory work of the previous study.

Major Findings: (a) Over 80 transfusion of Rh_o variant (D^u) blood have been given with no demonstrable antigenicity. This study has now been discontinued and a report is being prepared.

(b) The use of platelet rich plasma and platelet concentrates has continued to be effective in stopping hemorrhage and reversing the generalized bleeding tendency of children with leukemia. The donation by an individual of platelets from two pints of blood two to three times a week for a period of months did not harm the donor. A report has been prepared of this study of plasmapheresis as a method of obtaining platelets.

(c) Alsever's solution containing glucose has been found to be a useful suspending medium for red blood cells with known antigenic properties that are frozen in liquid nitrogen and thus preserved for routine laboratory use as reagents for the identification of antibodies. Thus far, the integrity of the antigens have been preserved without measurable loss.

(d) A stockpile of rare red cells is maintained for use in transfusion. The use of the cells frozen in glycerol at dry ice temperatures for periods in excess of a year is yielding data useful in formulating standards for the utilization of red blood cells subjected to low temperatures in various media.

Significance of Research:

The standards for blood products which this Laboratory must establish must be based on practical experience in handling these products before applications are considered for license. Experience gained in establishing requirements for the various formed elements of blood has immediate value in the functions of the Division of Biologics Standards. In addition, projects such as the preparation of platelets and the storage of frozen red cells give a background of information useful in evaluating license applications and the need for control.

Proposed Course of Project:

All aspects of this project will continue

Part B included Yes /X/ No /_/

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B. Honors, Awards and Publications

Publications other than abstracts from this project:

Kliman, A. and Schwab, P. J. Plasmapheresis with Sinple Equipment. American Journal of Clinical Pathology, 36, 379-382, 1961

Kliman, A., Gaydos, L. A., Schroeder, L. R. and Freireich, E. J. Repeated Plasmapheresis of Blood Donors as a Source of Platelets. Blood, 18, 303-309, 1961.

REPORT ON OTHER THAN RESEARCH OR CLINICAL ACTIVITIES OF
LABORATORY OF BLOOD & BLOOD PRODUCTS

In addition to the research activities outlined in the accompanying project reports, designed to complement and support control functions, the Laboratory of Blood and Blood Products has carried out its primary function of controlling the safety, purity and potency of blood and blood products. Chief among these control functions are the following.

1. As required by regulations, each establishment producing blood products was inspected at least once during the fiscal year. During the year, there have been 10 qualified inspectors available to perform this work in addition to their other duties. In fiscal 1961, the qualified inspectors performed a total of 304 inspections requiring 374 man days on travel status. In the last quarter of this calendar year, two major investigations of possible violations of the Public Health Service Act have taken a significant amount of effort on the part of the Laboratory staff. As of December 1, 1961 these two investigations have required 220 man days on travel status with the task still not completed. As a result, some research projects and other work not of immediate importance have been delayed.

2. Control testing has been carried out of the various blood and blood products produced by 157 licensees operating 229 principle locations and 219 donor centers and other subsidiary facilities. These licensees hold 593 product licenses for blood and blood products. This control testing includes all of the physical, chemical, immunological and related testing found necessary for action on the various blood products submitted for licensure or release or as the result of inspections. In 1961 control testing involved over 2200 lots of blood products including 410 inspection samples. In excess of 14,000 tests were performed on these products.

3. License applications for 25 blood products were reviewed and the licenses were granted. Four licenses were granted for establishments to produce blood and blood products. There are 12 licenses pending.

4. Labels and circulars were reviewed for all biological products from licensed manufacturers. Over 500 groups of labels and circulars were received and reviewed for compliance with the regulations. This work involved the labels and circulars from the currently 193 licensed establishments which are licensed for 284 different biological products and who hold 1,213 active product licenses each having its own labels.

5. Reference standards are maintained for 7 blood products. Work was continued on 10 new preparations for ultimate adoption.

6. The preparation of regulations and standards for the control of blood products has continued. Additional Standards for Packed Red Blood

Cells (Human) and for Heparinized Whole Blood (Human) have had final publication in the Federal Register. A draft of Additional Standards for Plasma (Human) has been circulated for comment before initial publication in the Federal Register.

7. The blood bank serving the needs of patients in the Clinical Center is operated as a Section of this Laboratory. This experience helps to maintain a realistic attitude toward control functions as the Laboratory continues to be aware of the requirements of meeting the needs of a research hospital. The equivalent of over 11,000 units of blood were processed in the blood bank in 1961 for patient care either in the form of whole blood or as special blood derivatives. Emphasis is being placed on the importance of fresh blood to support surgery utilizing extracorporeal circulation and on the use of platelet therapy in the treatment of thrombocytopenic states. The increased need for platelets has resulted in increased use of plasmapheresis.

8. An additional 453 NIH employees were grouped and typed for inclusion in the panel of typed donors. These employees are available as a valuable resource as a source of extensively characterized red cells for use in the control and research program of the Laboratory. At present there are 1050 employees listed on the panel which is utilized at least weekly.

9. When travel schedules permit members of the Laboratory staff are participating in blood bank workshops and training programs. This activity, while performed on an informal basis, nevertheless allows more efficient dissemination and illustration of information on blood banking techniques. Ways and means are being explored that will allow greater participation by the Laboratories trained staff in these training programs as a contribution to the raising of the standards of achievement of blood banks.

10. During the year, the Laboratory completed the experimental aspects of a study on interchangeability of disposable transfusion equipment being carried out in cooperation with the American Standards Association and the International Standards Organization. A report of this work is in preparation.

Annual Report of Activities
Division of General Medical Sciences
Calendar Year 1961

SUMMARY STATEMENT

During the past year the Division of General Medical Sciences has expanded its program activities in many areas in keeping with increases in its responsibilities and budget.

DGMS was established in 1958 to foster and support research in the basic biomedical sciences and in certain clinical areas through research and research training grants in the sciences basic to medicine and biology, and by means of fellowships to individuals for general research training. Its appropriations have grown from $26,738,000 in FY 1959 to $124,587,000 in the current year.

Responsibilities of DGMS include the administration of research grants, research training grants, and fellowships in the basic health sciences. The Division also directs the Center for Aging Research, the General Clinical Research Centers Program, the Center for Research in Child Health, and the General Research Support Grant Program. The latter two responsibilities were assigned to DGMS during the past calendar year.

G. Halsey Hunt, M.D., and Frederick L. Stone, Ph. D., continue to be Chief and Assistant Chief, respectively.

Budget

The following table summarizes the growth in the appropriations for the Division over the past 3 years:

	F.Y. 1960	F.Y. 1961	F.Y. 1962
Research Grants	$23,559,000	$37,143,000	$ 51,747,000
Training Grants	13,040,000	27,000,000	31,000,000
Research Fellowships	5,310,000	10,100,000	11,290,000
Review & Approval	1,280,000	1,687,000	2,560,000
Administration			490,000
Clinical Research Centers		5,000,000	27,500,000
Total	$43,189,000	$80,930,000	$124,587,000

PERSONNEL

At the end of calendar year 1960, there were 103 persons in DGMS. At the end of calendar year 1961, there were 118 persons, assigned as follows:

Office of the Chief	6
Administrative	16
Information	6
Program Planning and Evaluation	2
Research Training Branch	45
Research Grants Branch	30
General Clinical Research Centers Branch	7
Center for Aging Research	3
Center for Research in Child Health	0
General Research Support Grants Program	3
Total	118

Major Personnel Additions

Ruth G. K. Beecroft, M.D., Research Program Analyst,
Research Grants Branch

Eugene Byrd, Ph. D., Psychologist
Center for Aging Research

Roger B. Fuson, Ph. D., Research Program Specialist,
Research Grants Branch

Aaron Ganz, Ph. D., Executive Secretary,
Research Career Award Committee,
Research Fellowships Section,
Research Training Branch

*Donald Harting, M.D., M.P.H.,
Director
Center for Research in Child Health

Louis P. Hellman, M.A., Research Program Specialist,
Research Grants Branch

Kathryn R. Lewis, M.D., Research Program Coordinator,
Research Grants Branch

Charles A. Miller, Ph. D., Research Program Specialist
Research Grants Branch

* Entered on duty in January 1962.

Clem O. Miller, Ph. D., Executive Secretary,
Research Fellowships Section,
Research Training Branch

Vincent E. Price, M.D., Director,
Medical Student Research Training Program
Research Training Branch

Julius Rosen, Financial Analysis Officer,
General Clinical Research Centers Branch

Trygve W. Tuve, Ph. D., Research Program Specialist,
Research Grants Branch

Gene A. Ward, M.D., Program Specialist,
General Clincial Research Centers Branch

RESEARCH GRANTS BRANCH

There is little question that during the past year research in sciences basic to medicine and biology achieved even greater importance, both within activities sponsored or supported by the government and within other programs. Evidence of this growth is found in part in the fact that in June 1961, in New York City, the American Medical Association sponsored its First Multiple Discipline Research Forum for the purpose of holding symposia and seminars, and hearing papers, on contributions to medicine by research in various basic sciences. This forum was supported by an NIH grant through DGMS. Papers were read on the contributions to medicine by research in fields such as physiology, biophysics, microbiology, genetics, nutrition, and others. Considerable attention was drawn to contributions by research in fields such as biochemistry in diagnosing and developing therapy for diseases such as sprue, pernicious anemia, rickets, and others. The field of genetics was cited for the potential it holds in man's effort in the future to control his biological destiny. Most of the papers presented have been or will be published in the Journal of the American Medical Association.

Thus the Research Grants Branch of DGMS is continuing to encourage work in these basic biomedical sciences:

Chemical, including biochemistry in carbohydrates, fats, minerals, steroids, amino acids, nucleic acids, enzymes, proteins; pharmacology; metabolism and nutrition.

Physical, including biophysics, biomedical engineering, and other related fields.

Biological, including physiology, cell biology (and tissue culture), all phases of genetics, reproduction and development, microbiology, histology, etc.

Preclinical, including endocrinology, pathology, anatomy, hematology.

During calendar year 1961, approximately 65% of DGMS research grant funds went into these areas.

Clinical Sciences.

In this area DGMS is supporting work in fields such as anesthesiology, pediatrics, surgery, orthopedics, obstetrics and gynecology, dermatology and forensic medicine.

During calendar year 1961 approximately 12% of DGMS research grant funds went into these areas.

Public Health, Medical Care, and Nursing.

DGMS support for research in these areas, not specifically disease-oriented, includes therapeutic measures applicable to large groups, and field studies to evaluate their effectiveness; development of epidemiological and biometrical methods applicable to large-scale investigation of disease; studies of nursing procedures and their evaluation in relation to the patient, and the role of the nurse in communicable disease control; and empirical investigations and comparative evaluations of public health practices in the care and rehabilitation of the chronically ill. Approximately 11% of DGMS research grant funds went into these areas during calendar year 1961.

Methods and Tools of Science.

These studies deal with the development of new instruments to measure chemical and electrical properties of the body; biometrical and statistical innovations which are expected to yield mathematical insights into organic functions ranging from molecular and cellular organizational levels to patterns of disease in populations; and such diverse studies as investigation of factors influencing students in their selection of professional careers in medical and nursing fields, electronic computer technology, and support of working research conferences and interdisciplinary meetings for specialized problems. Approximately 12% of DGMS research grant funds went into these areas during calendar year 1961.

Analysis of DGMS Research Grants as of December 1961.

An analysis of grants by DGMS reveals that the Division awarded 1,242 research grants to educational institutions in fiscal year 1960, and 1,270 in fiscal year 1961, or about 88% of the total number of grants awarded. Twelve percent, or 143 grants in fiscal year 1960, and 178 in fiscal year 1961, went to research foundations and institutions not connected with a

university. (In addition, during fiscal year 1961, there were 345 grants awarded in the field of Environmental Health before the program was transferred to the Bureau of State Services on July 1, 1961.)

Of the grants awarded, the greatest percentage for both years went to universities exclusive of schools of medicine, public health, nursing, etc. In fiscal year 1960, the universities received 421 grants, or about 33% of the total, and in fiscal year 1961, 461 grants, or about 31% of the total.

Medical schools received the second largest number of DGMS grants; 325 in fiscal year 1960, and 439 in fiscal year 1961. This was roughly 30% of the total. The remaining 37% of the total grants awarded went to 16 other types of schools, including liberal arts colleges, technological schools, marine laboratories, and forestry and agricultural schools.

Twenty-one awards were made in an amount of $100,000 or over. These awards represent approximately 1% of the number of research grants, but 10% of fiscal year 1961 funds for research in the basic science fields. The average of these awards was $176,600.

GENERAL RESEARCH SUPPORT GRANTS PROGRAM

Administrative responsibility for the new General Research Support Grants Program was assigned to DGMS in the summer of 1961. It was decided that institutions initially eligible for grants under this program would include the schools of medicine, dentistry, osteopathy, and public health. By August 4, 1961, Information Statements had been distributed to all schools. By September 8, application forms had been developed and sent to all schools. By the end of October all 153 eligible institutions had submitted applications for funds. Awards are being made about January 1, 1962.

While extending approved institutions some additional freedom in determining the specific uses of the funds for research and research training, the funds may be used only for these purposes, with indirect costs being covered by an amount totaling 15% of the grant funds proper.

Preliminary discussions are being held regarding the possible extension of the program to schools of nursing, pharmacy, veterinary medicine, hospitals and other institutions. Other discussions are under way with regard to changes in the formula by which the amount of each grant is determined; and discussions have been held with regard to the eligibility of certain types of institutions providing training in public health.

CENTER FOR RESEARCH IN CHILD HEALTH

On February 8, 1961, the President directed the Secretary of Health, Education and Welfare to establish a Center for Research in Child Health within the Public Health Service. In accord with the President's directive, the

Secretary and the Surgeon General created such a Center in this Division. The appointment of Dr. Donald Harting as Director of the Center was announced on January 22, 1962.

The Center is intended to direct a program aimed at encouraging and stimulating research and research training in the basic biological, behavioral, and clinical sciences related to the problems of childhood and adolescence. It will also strengthen the role of the NIH in the multidisciplinary fields related to child growth and development.

On July 12, 1961, Secretary Abraham Ribicoff recommended to the President that a National Institute of Child Health and Human Development be established at NIH. Legislation to authorize such an Institute and also an Institute of General Medical Sciences was introduced into the Senate (S. 2269), on July 18, and in the House (H.R.8398), on July 31, but no action was taken during the first legislative session.

General Clinical Research Centers Section Raised to Branch Status

The General Clinical Research Centers section of the Division was raised to Branch status on August 2, with Dr. Sam Silbergeld continuing to head the program. This program was established in 1960, Congress providing $3 million in the several NIH appropriations for the first clinical research centers. The program is directed toward the establishment of a series of specialized clinical research facilities to permit enhancement of the quality of clinical investigations in medical institutions. Such units are available for multicategoric and multidepartmental research use, in which investigators with a variety of research interests and techniques participate.

In 1961, the Congress appropriated $5 million directly to the Division of General Medical Sciences and $3 million to the six Institutes, a total of $8 million to be expended by DGMS for the continuation of the program. For Fiscal Year 1962, Congress provided DGMS $27.5 million for the program.

In General Clinical Research Centers, research activity is not focused primarily on one category of disease, but rather on many categories of disease and on many areas of the preclinical and clinical sciences. The various basic and clinical skills are coordinated on a variety of fundamental problems.

As of December 31, 1961, DGMS had awarded grants for the establishment of a total of 40 centers.

SPECIAL RESEARCH RESOURCES

Congress has appropriated $5 million to support specialized facilities for computing and data processing, for development of electronic and other instrumentation, and for other specialized services in support of institutional research programs. These resource center grants will support basic technical services, trained personnel, and specialized equipment. The substantial

research will be supported, however, through the regular research grant program. The program will make possible the application of the large and increasing body of new technical developments in the physical science fields such as mathematics, electronics, and nuclear science, to the complex problems of biomedicine.

ENVIRONMENTAL HEALTH PROGRAM

Administrative responsibility for approximately $7 million in grants under this activity was transferred to the Bureau of State Services on June 30, 1961. These grants supported research in air and water pollution, accident prevention, food technology, and other aspects of environmental health.

RUSSIAN SCIENTIFIC TRANSLATION PROGRAM

On June 30, 1961, the Russian Scientific Translation Program was transferred from the Division to the National Library of Medicine. The Program administers the translation of Russian papers, journals, and other printed matter pertaining to medicine and biology, and makes them available to American scientific audiences.

RESEARCH TRAINING BRANCH

Support for the training of scientific manpower for future research and teaching requires a variety of award systems tailored to fit the special needs of individuals and institutions. The research training grant program and the research fellowship award program are designed to be mutually supporting.

In calendar year 1960, 436 training grants were supported at a level of $20.6 million. During 1961, the availability of $26.1 million permitted the support of 463 programs in training sites of high caliber as recommended by the National Advisory Health Council and other expert scientific consultants.

Grants of funds are made to public and private nonprofit institutions for the establishment, expansion, or improvement of graduate research training programs in such areas as mentioned below, and in other basic biological or health-related sciences where a major shortage of trained scientific personnel exists. The disciplines currently being supported by the Division are: Anatomical Sciences; Biochemistry; Biomedical Engineering; Biometry; Biophysical Sciences; Developmental Biology; Environmental Health; Epidemiology; Genetics; Microbiology; Nutrition; Pathology; Pharmacology and Anesthesiology; Physiology; and Research Surgery. The Special Grant Program is concerned with the problems of specialized research manpower shortages.

Medical Student Research Training Program

During the past 5 years, DGMS has awarded grants to a number of medical schools as part of an Experimental Training Program to encourage and assist selected

medical students to undertake training in medical research during the summer, free quarters, or a drop-out year, in the course of their medical education. This program was so successful that it was converted this past year into a permanent Medical Student Research Training Program.

The program makes funds available to medical schools for the establishment, expansion, or improvement of research training programs for the research training of medical students who may become future faculty members. The program encourages and assists in strengthening the basic science areas of medical schools by the introduction of new natural science disciplines, interests, and competencies.

No firm pattern is prescribed for schools to follow, but instead they are encouraged to design their own plans for exploring new processes and techniques for the research training of medical students. The grant funds are intended to help cover the costs of identifying and giving special attention to selected, highly motivated students, but may not be used to provide support for regular courses of study required for the M.D. degree. The grants may provide funds for the services of professional and ancillary personnel, stipends and supplies for research trainees, limited funds for travel needs in furtherance of the training program; and cover expenses of special courses, lectures, symposia, etc.

Twenty grants are being supported in this area, in the amount of $896,968.

Research Fellowships and Career Awards

During 1961, the Division supported 995 fellows, for a total of $4,166,000 under the Regular Research Fellowship program. Training under this program includes Predoctoral, Postdoctoral, and Special Fellowships, and its purpose is to increase the number of scientists qualified to carry on independent research.

A Predoctoral research fellowship is awarded to a qualified person holding a bachelor's degree or having equivalent training. It is awarded for 1 year and may carry up to 3 additional years of support. Fellows are expected to carry on studies oriented toward graduate training in the health science fields or related areas. A Postdoctoral research fellowship is awarded to a qualified person holding a doctor's degree for training in the basic sciences. It is awarded for 1 year and may carry up to 2 additional years of support. A Special fellowship is awarded to an individual to provide advanced or specialized training for research in the field of health and related areas, and is awarded for such terms as may be necessary to accomplish its purpose, usually for 1 year. A fellowship in Nursing research is available to any professional nurse holding a bachelor's degree who is interested in research training in nursing or any of the health sciences.

The purpose of the Research Career Award Program, which was initiated this year, and which merges the Senior Research Fellowship Grant, Special Fellowship Grant, and Research Professorship Grant programs, is to provide increased numbers of stable career opportunities for qualified candidates in the health-related sciences. Under this program two groups of awards are available:

The Research Career Development Awards are for young investigators, as well as for scientists undertaking independent research who need further experience to qualify for senior positions. The candidate must have had at least 3 years of relevant research or professional experience following the doctoral degree. Awards may be made for initial periods of 5 years and may be renewed upon adequate justification to provide a total period of support to an individual of not more than 10 years, and the recipients of these awards may be nominated for consideration for Research Career Awards at any appropriate time.

The second group of awards available are the Research Career Awards for experienced investigators who are continuing to develop in productive careers of independent research and teaching, and are intended to finance additional stable positions and are made on the basis of nationwide competition. Research Career Awards are made in 5-year increments with review at appropriate intervals to ensure that the award continues to promote the objectives of the program. A maximum of four applications for Research Career Awards will be accepted from an institution (i.e., four from each medical, dental, or graduate school, etc.) in any year.

During calendar year 1961, there were 320 Research Career Development Awards, for a total of $6,791,544 and 2 Research Career Awards, totaling $34,701.

Listed below are the fellowships and career awards obligated as of the end of calendar years 1960 and 1961:

	Calendar Year 1960		Calendar Year 1961	
Awards	Number	Amount	Number	Amount
Predoctoral Fellowships[1/]	551	$1,913,823	751	$ 2,529,440
Postdoctoral Fellowships	117	684,773	188	1,159,078
Special Fellowships	19	149,883	56	477,482
Part-time Fellowships)[2/]	325	210,584	572	370,656
Postsophomore ")[2/]	144	566,915	95	393,953
Senior Fellowships[3/]	198	2,882,798[4/]	221	4,957,773[4/]
Foreign Fellowships[5/]	59	446,642	98	7[illegible],377
Research Career Development Awards			99	1,833,771[4/]
Research Career Awards			2	34,701
	1,413	$6,855,418	2,082	$12,473,231

1/ Includes fellowships in Nursing -- 66, $296,770 during 1960; 49 $220,042 during 1961.
2/ As of July 1, 1961 these fellowships were absorbed by the General Research Support Program, except for Nursing Part-time.
3/ Senior fellowships merged into the Research Career Award Program in July 196[illegible]
4/ Includes $397,192 from DGMS research grant funds for support of the researc[illegible] allowance in 1960; $1,925,148 in 1961.
5/ This program was transferred to the Office of International Research, [illegible] on June 30, 1961.

Foreign Grants and Awards Program

On June 30, 1961, the Foreign Grants and Awards Program was transferred from the Division to the Office of International Research in the Office of the Director, NIH.

CENTER FOR AGING RESEARCH

The Center for Aging Research, a component of DGMS, serves as the NIH focal point for extramural research in aging. The Center stimulates research projects, fosters training of additional research personnel, collects and disseminates data related to research in aging, sponsors conferences and symposia on research and training problems in the field of aging, and maintains liaison between the NIH intramural and extramural programs with other bureaus and divisions of the Department.

Major emphasis during the past year has been on stimulating new projects for aging research, and on collecting and disseminating data related to aging. A comparison of the number of grants for extramural projects for the 5-year period ending January 31, 1962 reflects the activity in this area:

	Number of Grants
January 31, 1958	274
January 31, 1959	404
January 31, 1960	582
January 31, 1961	700
January 31, 1962	900 (est.)

These 900 (est.) extramural projects are conducted in medical schools, universities, and private research institutes in this country and abroad, and include five large multidisciplinary centers for aging research. In addition to the centers located at Duke University, Durham, North Carolina; Albert Einstein College of Medicine, New York City; Western Reserve University, Cleveland, Ohio; and the University of Miami School of Medicine, Miami, Florida, whose programs focus on the medical and biological aspects of aging, a new center was inaugurated in June at Brown University, Providence, Rhode Island, with initial emphasis on the socio-economic problems of older persons.

In addition to the extramural programs, which are supported by all of the Institutes, there are about 100 intramural projects being conducted in the laboratories at NIH, and two Institutes, the National Heart Institute and the National Institute for Mental Health have special intramural research programs in aging.

During the past year, in addition to the three annual publications of the Center, "Research Highlights in Aging," "Research Programs in Aging," and "Activities of the NIH in the Field of Gerontology," another publication, "The Aging Patient," the first of a series, was made available to over 6,000 physicians, nurses, and others. The first volume was concerned with the dietary and therapeutic needs of older persons; the second volume, now being

prepared, is on cardiovascular diseases. An exhibit illustrating the functions of the Center, the various components of the Department of Health, Education, and Welfare having related programs, and the grant mechanism of the National Institutes of Health was shown at four, large national meetings.

The Center staff attended and assisted with 10 national meetings concerning aging research and problems of older people; one of the most important programs assisted by Center personnel was the White House Conference on Aging.

NATIONAL ADVISORY HEALTH COUNCIL

During the year four new appointments were made to the National Advisory Health Council. These were: Dr. Lloyd V. Berkner, Dr. Michael E. DeBakey, and Dr. Edward W. Dempsey replacing Dr. Philip Handler, Dr. George T. Harrell, and Dr. Malcolm H. Merrill, whose terms expired; and Mr. Herbert M. Bosch filling the unexpired term of Dr. L. A. DuBridge, who resigned. Mr. Boisfeuillet Jones resigned his appointment when he became Special Assistant for Health and Medical Affairs, DHEW. Other members of the Council are: Dr. H. Stanley Bennett, Dr. James P. Dixon, Dr. Sidney Farber, Mr. Russell R. Larmon, Dr. I. S. Ravdin, Dr. Francis O. Schmitt, and Dr. Lewis Thomas. Dr. Robert A. Aldrich continues as consultant to the Council.

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Annual Report of Program Activities
Division of Research Grants
Calendar Year 1961

Summary Statement

The Division of Research Grants continued to function in 1961 as the coordinating center for the extramural grant and award programs of the National Institutes of Health. In fiscal year 1961, grants amounting to $273,941,050 gave initial or continued support to 13,534 research projects in 1,007 institutions in this country and in 217 institutions abroad. During the same period, 4,208 fellowship awards were made totaling $22,068,875; 3,586 training grants, amounting to $108,377,930; and 138 health research facilities construction grants totaling $31,784,638.

In addition to servicing the NIH extramural program, DRG now processes and reviews grants for the following divisions of the Bureau of State Services: Air Pollution; Environmental Engineering and Food Protection; Occupational Health; Radiological Health; Water Supply and Pollution Control; Accident Prevention; and Hospital and Medical Facilities. All branches of the Division have provided advice and assistance and participated in orientation programs for the new staff members of the grants branches of the Bureau of State Services. A new "Grants Associate" program, designed to recruit and train professional staff for the extramural branches of all granting divisions of the Public Health Service was begun in 1961, with DRG slated to underwrite all trainee salaries and to serve as a primary training locus.

An organizational change of major importance which took place during the year was the consolidation of the former Research Fellowships Review Branch and the Training Section of the Office of the Chief into a Career Development Review Branch. This branch now services the regular Fellowship, Research Career Award and Training Grant programs.

In response to the increasing application workload (25.7 percent in one year) and the increasing diversity of biomedical research, the Research Grants Review Branch established five new study sections, bringing the total to 42. The Accident Prevention Research, the History of Medicine, and the Primate Research Committees were elevated to the status of study sections, and the Surgery and Pathology Study Sections were each divided into sections I and II.

The Health Research Facilities Program administered by the Health Research Facilities Branch was extended by the 87th Congress for one additional year with expected continuation of the program and an increased budget in future years.

One of the year's important developments was initiation of a Research Grants Index. Based on a keyword system, the publication indexes the scientific content of all extramural research projects supported by the Public Health Service, and will be produced annually.

Information Office

Established in the Office of the Chief, DRG, the Information Office is responsible for planning, developing, directing and executing a broad program to provide both special and across-the-board information on the policies, programs, activities and accomplishments, and the technical and administrative aspects of the NIH extramural programs for research, training, and construction.

In line with the expanding extramural programs and an attendant rise in the volume of requests for information services, the Office added two information specialists and a clerk-typist to its staff during the year. Following the move in November to the new building, the Information Office began serving as the Division's repository for scientific journals, reports and other materials, and a new staff member was assigned duties in connection with this function.

The office continued in its responsibilities in the preparation of annual and special reports; speech preparation and other writing services for Division, NIH and Department officials; supplying visual aids for speakers and presenting and staffing exhibits; writing and distributing press releases and announcements; preparing weekly reports to the Surgeon General on program developments; handling voluminous public inquiries by telephone and correspondence; providing editorial assistance as required; handling clearances of manuscripts, and other general information services.

Special Programs Review Branch

This Special Programs Review Branch was established in the Division of Research Grants in October 1960. The function of this Branch is to determine the scientific potentiality and the administrative adequacy of applications for research program and research center support, to provide this evaluation to the Institute or Division concerned with appropriate documentation and to establish and maintain policies and procedures for assuring an impartial and authoritative evaluation of applications assigned to the Branch for review.

The Branch is comprised of the Office of the Chief, supported by a Technical Review Section and an Administrative Analysis Section. The Technical Review Section is comprised of professional Executive Secretaries who function with groups of non-Government Consultants called Program-Project Committees. Program-Project Committees have been established for each of the areas represented by an Institute or Division with an extramural research program, i.e. NIAMD, NIAID, NCI, NIDR, NHI, NIMH, NINDB and DGMS. In addition, a separate committee, The General Medical Clinical Research Center Committee, has been established to advise DGMS on its non-categorical clinical center program.

The Administrative Analysis Section, currently in process of organization, will work with the Technical Review Section aiding in the total evaluation by establishing and maintaining procedures to determine the administrative adequacy of each proposal.

Research Program Grants are awards made to an institution, in the name of one or more Program Directors for the support of a broadly based and usually long-term program of research activity. Program Grants are flexible in nature,

ordinarily require large sums of money, and typically involve the efforts of relatively large groups of workers. They may include research directed toward a range of problems within a broad category rather than toward a specific single-purpose investigation, or may include research directed at a highly specific objective but approached from a broad base. Research Program Grants may include funds for facilities, other than actual contraction, as well as for the research itself.

Research Center Grants are awards made to provide basic resources and the support of common services for broad and flexible research efforts. Center grants may provide resource support for either categorical or non-categorical research facilities. Research Center grants are made to duly constituted organizations, or units thereof, in the name of a designated director who is responsible for the administration of the center and its staff.

The Branch assumed responsibility for the review of applications requesting research program support as of July 1, 1961. A total of 49 applications requesting about 12 million dollars in initial year support have been reviewed since that date. Of these, 18 were recommended for approval, 9 for disapproval and 22 for deferral. All recommendations for approval or disapproval by a Program-Project Committee were preceded by a site visit by a group of consultants to obtain detailed information first hand.

Work is continuing to develop more effective evaluation procedures to deal with this new type of research support. Both experienced Government grant administrators and outside authorities are being called upon in this regard.

Review and Referral Branches

During the calendar year 1961, the Referral and Review Branches have provided administrative processing and scientific review for 9,571 research grant proposals. The latter number represents a 25.7 percent increase over the application workload of calendar year 1960.

The increased burden of work was accepted and accomplished with no decrease in quality of processing and review and with minimal increase in staff. Internal rearrangements of workflow and improvement of administrative procedures, and dual work assignments for senior staff accounted for the increased efficiency.

The Branch also provided orientation advice and assistance to the new extramural program staff of the Bureau of State Services. A new coding system, appropriate for the increased diversity of grant categories and extramural programs was developed and implemented. Studies of the scientific orientation of the study sections, with regard to the needs of new PHS programs and shifts of emphasis in biomedical research in the field, were initiated and will continue into the coming year.

Grants Management Branch

Scope of Activity

The Branch's activities, related to the management of the National

Institutes of Health grants programs, are directly involved in the administration of the research project and training programs grants with peripheral involvement in the management of Program Project, Clinical Center, General Research Support and Health Research Facilities grants. The Branch exercises influence upon virtually every aspect of administration (exclusive of scientific consideration) of the Institutes' grant programs, and also services other Divisions of the Public Health Service and the Office of Vocational Rehabilitation.

General Responsibilities

The Branch facilitates the administration of the National Institutes of Health and companion agency grants programs in seven principal ways:

(1) It provides leadership in policy development and interpretation

(2) It coordinates and oversees most of the fiscal management policies and requirements applicable to grants

(3) It provides the mechanism for implementing payments and, to a limited degree, controls grant funds through verification, detail recording and reporting analysis

(4) By reason of its role in the area of fiscal policy, it is one of the instruments by which the Institutes and the grantee institutions execute their financial plans

(5) It attests to the legality and propriety of expenditures made by grantees from grant funds

(6) It serves as a sounding board for over 1200 grantee institutions on matters pertinent to the management of grants

(7) It speaks for the National Institutes of Health on inter-governmental committees and before University associations on matters of mutual interest in the administration of grants programs

1961 Activities

With accelerated velocity, the volume and variety of problems encountered by the Branch in its daily operations through correspondence, telephone communications and personal contact with the Institutes, other Public Health Service Bureaus, the Office of Vocational Rehabilitation and the grantees, have sharply increased during 1961. A recent survey covering the period March to August, 1961, revealed that in volume alone more than 4,500 pieces of correspondence to grantees were initiated and 391 long-distance telephoned calls from grantees were received on grants management matters. The magnitude of the

number of inquiries received and replies initiated by a relatively small staff during this five-month period becomes more significant when it is considered that many form letters, (1) acknowledging receipt of refund checks, (2) requesting refunds of less than one dollar, (3) notifying grantees of minor adjustments on financial reports and (4) advising the grantee of the disposition of unexpended balances, were discontinued during the early part of the year.

Advice and counsel on policy and applications for grants, to Grants Branch chiefs, Executive Secretaries, and Grants Assistants, were of such a volume and complexity as to preclude a meaningful statistical measurement in the absence of time and staff to maintain such records.

The Branch participated in the development, implementation, and revision of changes in policy pertaining to the utilization of grant funds.

The Branch has also had increasing responsibilities involving relationships with Congressional staff and representatives of the General Accounting Office on matters pertaining to the administration of the NIH grants programs. In particular, the Branch spent considerable time in reviewing, assembling and discussing materials of interest to the House Committee on Inter-governmental Relations.

A brochure entitled "Compilation of Administrative-Fiscal Policy and Procedures Governing Grants and Awards" is undergoing revision and is expected to be available for release to officials of the grantee institutions and interested personnel of the National Institutes of Health in the spring of 1962, when approved by proper authority. This will be the second edition of the brochure, developed on a broader and more comprehensive scale.

Policy, Procedure and Audit Review Section

This section is responsible for the review of all reports of grants audited by the grants audit section. When disallowances are recommended, it determines if the exception is within the framework of existing NIH policies and grantee institution operating policies. Grantees are advised of exceptions recommended to permit appeal and further review on the basis of newly disclosed facts, or the basis for these recommendations and the disposition to be made of the disallowed amounts.

The section also has the responsibility of administering Chairman's grants and for auditing these grants upon their termination.

During calendar year 1961, the Policy, Procedure and Audit Review Section initiated approximately 1,600 letters to grantees regarding exceptions recommended by the field auditors. The 753 exceptions sustained resulted in disallowances totalling $254,987.10. The section furnished advice and assistance on a variety of procedural matters involved in the management of grants.

Grants Audit Section

The Grants Audit Section is charged with the responsibility for auditing the grant accounts maintained by the grantee institution to determine the pro-

priety and legality of charges made against grant funds. In addition to auditing grants awarded by the National Institutes of Health, the section also performs audit of grants administered by the Office of Vocational Rehabilitation, the Bureau of State Services and the Division of Community Health Practices.

During calendar year 1961, a supervisory audit staff was formed, audits were performed on a team basis and a management-type audit was instituted to replace the voucher review-type examination. These new audit concepts resulted in the completion of 9,500 audited grants representing a substantial increase in production over calendar year 1960. Additional audit staff are being recruited and upon the completion of their training, will enable the audit section to keep abreast of the workload better.

Financial Management Section

The functions of the Financial Management Section are designed to lend support and offer service to the Divisions, Institutes, Grants Audit Section and Grantee Institutions. The Section's activities and accomplishments by individual unit, are as follows:

Grants Payment Unit - The centralized review verification and processing of authorizations for payment of grants and the maintenance of centralized payment control records. Through the use of more efficient operating techniques, the unit has accelerated payments on grants and the verification of payment lists, enabling it to keep abreast of the expanding grant programs. During the year, quarterly payments on approximately 20,000 grants were verified and processed.

Grants History Card Unit - Maintains historical records for all active and inactive NIH grants and controls the disposition of all unexpended balances as indicated on financial reports submitted by grantees. The unit received and processed approximately 18,000 reports of expenditures and 970 refund checks during the calendar year besides posting innumerable transactions to the history record cards which are of considerable value in management.

Financial Report Unit - Reviews and checks all incoming reports of expenditures with mathematical review and pre-audit of reports for which supporting vouchers and fiscal documents are submitted. The unit provides supporting services to the Audit Section through a preliminary review and verification of financial reports and the preparation of worksheets to expedite the audit process. At present trained personnel are available to allow the preliminary review of the reports of expenditures and supporting vouchers and fiscal documents of 2,500 grants annually.

Forecast for the Future

The entire area of grants management, encompassing policy formulation, procedures development, issuance, financial operation and audit has been undergoing intensive review. The size, complexity and diversity of the grants programs in the Public Health Service will of necessity require a substantial re-

structuring of grants management at headquarters and possibly the addition of support in the field. Wider responsibilities, precise delegations of authority intensified surveillance, a greater degree of specificity in policies, and the probable issuance of regulations signal an elevation in the status of managemen for the grants programs. In volume, during 1962, almost 25,000 grants may be awarded to about 1,700 grantee institutions in the United States and foreign countries.

Health Research Facilities Branch

The Health Research Facilities program, which provides grants for construction and/or equipping facilities for research in the sciences related to health, is administered by the Division of Research Grants. Since the inceptio of this program, July 30, 1956, 1,249 new, deferred and supplemental applicatio have been received requesting $358,262,285 in Federal funds.

Grants

Appropriations of $180 million have been made for the first six program years - fiscal years 1957 through 1962. From these appropriated funds, 826 grants have been awarded to 330 institutions in 48 States, the District of Columbia and Puerto Rico, totaling $163,411,520. In addition, 46 applications, in the amount of $16,587,135 have been recommended for approval from fiscal year 1962 funds. This will complete the distribution of appropriated funds to date.

The National Advisory Council on Health Research Facilities, established under the original Act, also has recommended for approval 171 grants, totaling $44,965,739 when funds are available.

Title VII of the Public Health Service Act, as amended, was extended for an additional one year period (P.L. 87-395, approved October 5, 1961) and the program authorization was increased to $50 million per annum. The deadline date for the receipt of applications for the April 1962 meeting was extended to December 15, 1961, since no authority to accept applications under this Law existed between June 30, 1961 and October 5, 1961. The Law now provides that requests under this Title shall be made not later than June 30, 1962.

Twenty new and deferred applications requesting $17,993,249 awaited Council action with an estimated 95 additional applications requesting approximately $35 million expected prior to the December 15, 1961 deadline date, and 103 letters of intent to submit applications, amounting to $46.7 million were on record.

Meetings

National Advisory Council meetings were held in March, June and November 1961.

Completed Projects

As of December 11, 1961, 334 research facilities had been completed and were in use, representing Federal expenditures of more than $51,457,803.

Statistics and Analysis Branch

The Branch, with two administrative units (the Design and Analysis Section and the Statistical Processing Section), continued during 1961 to strengthen its activities centered around the following major objectives:

(1) Undertaking special studies and surveys on salient aspects of the NIH extramural programs

(2) Preparing recurrent reports and requested tabular and analytical data describing these programs

(3) Development of a comprehensive data processing and retrieval system that will allow for the collection of pertinent statistical data covering all of the complex grants and awards programs of NIH

Collection and compilation of data for the extramural programs is done mainly by the Statistical Processing Section; the analysis of data, by the Design and Analysis Section. Thus, the first objective is largely the function of the Design and Analysis Section; the third, mainly the function of the Statistical Processing Section; and the second, a shared function. It should further be noted that the Design and Analysis Section is vitally concerned with collection of data relevant to its special studies.

Progress of the Branch during the year in achieving the above objectives is recounted here in terms of the accomplishments of the two administrative units.

Design and Analysis Section

Special studies and surveys completed during the year are as follows:

(1) Principal Investigator Survey of 1960 - Final report

(2) Sites of the Schools Granting Undergraduate Degrees to Scientists Participating as Principal Investigators under NIH Research Grants in 1960

(3) Relationships between Study Section Recommendations and Advisory Council Actions on New Research Grant Applications for Fiscal Year 1960

(4) Other Sources of Support to Awardees of New 1960 Research Grants

(5) Some Aspects of Salary Support to Scientist Research Personnel through NIH Project Grants

(6) Some Demographic Characteristics of Scientists Participating in NIH Research Grants

(7) An Analysis of Expenditures under NIH Research Training Grants

(8) History of the NIH Extramural Programs

(9) Medical School Departmentalization

(10) Federal Reports Act of 1942 with Special Reference to NIH

Three additional studies ready for review in December are:

(1) A Study of Differential Characteristics of Approved and Disapproved Research Grant Applications

(2) A Survey Analyzing and Comparing Funds Budgeted and Approved, versus Funds Actually Expended, by Expenditure Categories for DGMS Training Grants in 1959 (for release to DGMS only)

(3) Trends (Fiscal and Quantitative) in the NIH Research Grant Program by Funding Institute, States and Geographic Areas of the United States - 1955 - 1960

Another project nearing completion in December was the preparation of a comprehensive list of "disciplines" relevant to research supported by the PHS.

A major survey of the characteristics of personnel working on NIH project research grants, with special reference to discipline profiles and their current academic and professional training went into planning stages. Preliminary activities with regard to this study include: feasibility studies, investigation of data sources, and planning of methodology. Other special studies have been planned and will be executed in accordance with priorities established by administrative need.

The Acting NIH Reports Officer is also a member of the Design and Analysis Section. First priority is given by him to his tasks as Reports Officer; i.e., consulting with those at NIH in order to clarify and prepare various forms so that clearance will be expedited and following the forms through official channels in order to expedite clearance.

Statistical Processing Section

The Statistical Processing Section in the past year collected data for the following publications:

(1) Public Health Service Grants and Awards by the National Institutes of Health, Fiscal Year 1961 Funds, Part I

(2) Public Health Service Grants and Awards by the National Institutes of Health, Fiscal Year 1961 Funds, Part II

(3) Public Health Service Grants and Awards by the National Institutes of Health, Summary Tables for the Total Extramural Program, Fiscal Years 1959 and 1960

The Section has also been developing an expanded program for the collec-

tion, storage, and retrieval of basic information concerning applications for grants and awards and results of actions taken on them. The growth of the Division of Research Grants extramural program influenced many aspects of the developing program in the kind and depth of information desired for administrative decision; thus, the fund of administrative information to be made available for management evaluation has been greatly expanded. The present design of the system provides for a single master source of data on magnetic tape, and establishes a central consolidated file of information promptly available for high-speed manipulation, extraction, and selection of data for preparation of reports and special studies.

The transition from a single punched-card system to the IBM 650 Computer, to the present Honeywell-800 Computer, required radical revision of existing machine programs. Procedures for data-capture, computer programming, and preparation of reports were adapted to meet new schedules. Additional training was required for computer programmer staff so as to gain new knowledge in the operations of the H-800. The expected advances in this area of total program development were not achieved due to a lack of programmer personnel, and computer programming routines at year's end were considerably behind schedule. Timely preparation of DRG reports within the ensuing year cannot be realistically expected in view of the inadequacies of supporting staff, space and equipment.

An essential ingredient to the proper development of an effective, responsive and timely reporting system is the acquisition of adequate modern electronic equipment, administered and controlled by the Statistical Processing Section. Two more Flexowriters and 12 pieces of IBM equipment were requisitioned to further SPS program development at data input points along with the recently installed Flexowriter programmatic, keypunch and verifier. This equipment is planned to be used as support for the Honeywell-800 Computer facility. Considering the present operational readiness of the H-800, the increasing demands for new analyses, as well as the preparation of continuing reports, a further requisition was made for standby data-processing equipment less sophisticated than the H-800. Staff studies and analyses concerning the needs for proper electronic equipment for the special requirements of the DRG program await management evaluation. In any event, the reports processing program for next year will continue in its conversion phases.

There is no assurance that the service of this Section will improve when conversion to the Honeywell-800 Computer is finally achieved. The resources needed for a realistic productive program to be in operation for FY 1963 were estimated as follows:

Staff	(professional, technical, clerical)	- 75 persons
Physical Plant	(including support equipment)	- 9000 sq. ft.
Equipment rental	(supporting the Honeywell-800 Computer)	- $125,000 per annum

Present resources include a staff of 46 persons, conducting their work in office space equivalent to 3500 sq. ft., with $200,000 per annum allocated for computer equipment services available in the Division of Research Services.

Career Development Review Branch

Creation of the Branch

With the consolidation of the activities of the Research Fellowship Review Branch and those of the Training Section, formerly in the Office of the Chief, DRG, the Career Development Review Branch was established. Responsibilities of the new branch include coordination and development of policies, rules and procedures for the regular Fellowships, Research Career Award and Training Grant Programs; the receipt, assignment and distribution of applications for these programs; the scientific review and evaluation of the regular Fellowships Program; and the analysis and evaluation of statistical data concerning the various extramural training programs of NIH.

During 1961, progress was made in developing a single functional organization from the various units which were brought together to form the new branch. The branch as now organized consists of 10 Fellowship Review Sections, as well as an Analysis and Evaluation Section, a Procedures Coordination Section, a Program Support Section, a Project Control Section, a Records and Reports Section and an Office of the Chief with two Assistant Chiefs, an Administrative Assistant, a Special Assistant for policy coordination, and a Project Review Officer.

Activities

A. Fellowship Programs

Previous to 1961, all fellowship awards were designated "Research Fellowships". With the decline of the individually awarded Traineeships (only NIAMD and NINDB had them in 1961), policies for fellowships were modified and "research" was dropped from the title. These changes necessitated revising the application form and the new one is now in use. With the revised form it became necessary to develop a form "the Fellowship Application Record" for exclusive use for data retrieval.

One of the first accomplishments of the newly established position of Special Assistant for policy coordination has been the updating and complete rewriting of "Rules Governing Regular Fellowships".

Again this year the number of applications for predoctoral, postdoctoral and special fellowships was significantly higher than in previous years. Growth in Training Grant Awards appears to have had no effect on demand for individual support through fellowships - around 3,800 applications were received for fellowship support in the first 10 months alone of 1961.

B. Training Grants

Much progress has been made in the identification of areas in which unnecessary differences of policy and procedure exist between Institutes, and some of these differences have been eliminated. Progress has also been made in identifying overall policies and procedures which require modification in the interest of improving the effectiveness of the training grant program and

the relationships between the National Institutes of Health and the training institutions. The branch received and processed more than 1,500 graduate training grants during 1961.

Following are some of the important activities to be completed during 1962:

(1) A questionnaire, Post-Training Record, prepared for use in the follow-up of trainees. It is expected that this follow-up will begin early in calendar year 1962 providing information on about 10,000 indirect trainees who have terminated on or before June 30, 1960.

(2) Revision of the form on which the appointment of trainees is reported. (Statement of Appointment - PHS-2271). This activity was begun and the revised form should be in use by mid-1962.

(3) Revision of the NIH Policy and Information Statement on training grants was begun and should be completed early in 1962.

(4) Revision of the training grant application form was begun and by late 1962 the revised application should be in use.

C. The Research Career Award Program

This program was officially launched July 24, 1961 with the issuance of a Policy and Information Statement which the branch participated in developing. It merges and modifies the Senior Fellowship Grants, Special Fellowship Grants, and the program started last year but never implemented - the Career Research Professorships.

Subsequently, a new application form was developed and a total of about 5,000 application kits were distributed to institutions throughout the United States by the Career Development Review Branch, the seven Institutes, and DGMS. A total of 81 applications were received for review by the November Councils and more than 350 for review by the March 1962 Councils. The Career Development Review Branch is serving a coordinative role in this program through central receipt and assignment of applications, review of applications for conformance to NIH policy and through regular meetings with representatives of the Institutes for the purpose of developing common procedures and common interpretations of policy.

D. Evaluation Activities

Data on the various programs under the Career Development Review Branch's responsibility; the regular Fellowships Program, Training Grants Programs, and their relevant indirect trainees, plus the Research Career Awards Programs, are captured and maintained on a current basis on IBM punch cards.

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D. Evaluation Activities

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Additional data are coded to tie in with the operations of the Statistics and Analysis Branch. Wherever possible comparable data are collected on all programs. With the recently acquired 870 Document Writing System the scope and flexibility of intra-Branch and extra-Branch activities have been increased.

The fourth follow-up survey of former fellows of the Public Health Service was completed in 1961. A report based on 2,917 returns, representing more than 90 percent of the fellows contacted was prepared. Eighty-seven percent of all former fellows are in research while 67 percent have some teaching activity. The average former fellow spends over half of his time in research, about 20 percent in teaching and the remaining 30 percent in clinical practice, administration, and other miscellaneous activities. Although the follow-up included those whose last awards were dated over 20 years ago, it was found that 94 percent of all were in fields of interest related to those of the National Institutes of Health. An increase in administrative responsibility and higher level positions held by the fellows has also been noted over the years.

A report, Growth Trends of the National Institutes of Health Regular Fellowship Programs, Fiscal Years 1955 - 1961, shows that the number of fellowship applications and awards has increased in each of the last six years. The number of applications received in fiscal year 1961 represented a 254 percent increase over those received in fiscal year 1955.

Internal Operations Branch

Internal Operations Branch provides a variety of administrative, service and housekeeping functions for Division personnel, as well as certain central services for the extramural programs of other Divisions and Institutes.

The revised organization of the Branch is as follows:

Office of the Chief

Provides overall supervision of all Branch activities and maintains liaison with other Divisions and Institutes.

Office Services Section

This section performs a variety of functions and duties, particularly those concerned with procurement, property, supply, and documents relating to these activities. In addition, this section inaugurated an application assembly unit to provide the various branches of the Division and the extramural programs of NIH with the completed application kits for their subsequent mailings to applicants.

Special Services Section

This section is primarily concerned with providing special services such as general typing, extra clerical and typing help on occasion and controlling the flexowriters to be used in the capture of information from research grant applications, fellowship applications and research training grant appli-

cations. This flexowriter operation is expected to facilitate the early capture of important data for subsequent incorporation into the overall EDP systems of the NIH. This section also provides certain art and graph work for publications, reports, etc.

Mail and File Section

This section expedites the tremendous flow of mail coming in to the Division each day. Since conversion to the open shelf files about 30 months ago, the volume of records maintained on these shelves has doubled, due primarily to the heavy influx of audit files on approved grants coming in from the institutions. The linear footage of shelving has been increased by about 145 percent, which has been necessary to accommodate the 30,000 to 40,000 active audit files for all extramural grants.

Travel Section

This section increased its staff to accommodate the additional workload reflecting the entire Division's growth. An innovation in handling the payment of fees and reimbursement for travel costs shows excellent promise of expediting this phase of the operations. An additional function of the travel section is handling the payment and travel expenses of consultants and committee members on a cash reimbursable basis as well as issuing the cash discount cards for the several car rental agencies throughout the country. With an increase of approximately 30 percent in travel funds for the Division in 1961, it is anticipated that in excess of 5,000 travel vouchers will be processed by the section for fiscal year 1962.

Duplicating Section

Effective July 1, 1961, the duplicating section was transferred to the Office of Administrative Management and is the principal component of the printing and reproduction section of that organization.

The Study Sections

In addition to their responsibility for conducting the technical review and appraisal of research applications and making recommendations to the Advisory Councils, the Division's 42 study sections also develop and encourage research in neglected areas of the health, medical, or related sciences.

During the past year, the study sections planned and programmed a variety of scientific conferences; sponsored the publication of proceedings of selected symposia; conducted evaluations of their individual programs and programmed in new areas; and engaged in a wide variety of other related activities.

A number of the study sections have been reorganized and redirected in order to strengthen various areas of research grant review. Some of the significant activities within the study sections during 1961 follow.

Accident Prevention Research

In January, 1961, the Advisory Panel on Accident Prevention became the Accident Prevention Research Study Section. Elevation of the panel to this status reflects recognition of the fields of accident prevention and injury reduction as developing research areas, and also reflects the efforts of this group in defining problems and research needs.

The research orientation is toward human factors involved in accident causation and the interaction of these with the physical environment. The largest segment of the research is concerned with traffic accidents--drivers, accidents, injuries, the car itself, the road.

Other projects concern studies of accidents in childhood, in the home and family, on the farm, poisoning and aviation accidents.

The multi-disciplinary composition of the Study Section permits review of applications from the point of view of experts in the following fields: pediatrics, preventive medicine, psychiatry, psychology, statistics, engineering, and safety education.

At the September meeting, the Study Section reviewed 30 applications, twice the largest number submitted at any previous review period. It is felt that this reflects an increased interest and activity in research concerned with the cause and prevention of accidents and/or injury and that it will be a continuing trend.

Behavioral Sciences Study Section

A meeting held by the Behavioral Sciences Study Section at the Center for Advanced Study in the Behavioral Sciences at Palo Alto, California, June 29-July 1, was a highlight of the 1961 calendar year.

In furtherance of Study Section's function as an advisory as well as consultant body, the meeting was devoted exclusively to discussion of matters relevant to Study Section review procedures, mechanisms by which Study Section programming activities may be most fruitfully carried out, and areas in the behavioral sciences in need of research stimulation.

As a result, the Study Section has undertaken, and will continue to undertake, activities leading to the improvement of research proposals in the behavioral sciences and the stimulation of research in specific underdeveloped fields.

During the year Dr. Charles E. Osgood, a member of the Study Section, became president-elect of the American Psychological Association.

Biophysics and Biophysical Chemistry Study Section

During 1961, activities of the Biophysics and Biophysical Chemistry Study Section were in keeping with the general programming philosophy of stimulating the development of biophysical research and training.

A conference on "The Role of the Physical Sciences in the Biological Sciences," held at the University of Miami, Coral Gables, Florida, December 26 to 31, 1960, was organized and sponsored jointly by the Study Section and the American Institute of Biological Sciences. Designed to elucidate the biologist's need for proper training in the physical sciences and to show how the physical sciences can be introduced into biology curricula, the conference was attended by 58 biology teachers from 35 colleges. This meeting was viewed as a possible prototype of others which might be held regionally.

Education Grants

A grant of $5,000 was made to the Educational Affairs Committee of the Biophysical Society to enable four college undergraduates to attend the International Biophysics Congress in Stockholm, Sweden, August 1 to 5, 1961. Announcement of the availability of these travel awards was made to most of the colleges and universities in the United States. Delegates were selected on the basis of quality of manuscript on a biophysical subject. Four seniors from Amherst College, the University of Chicago and Carnegie Institute of Technology--two coming from the latter--were chosen by the reviewing committee from 19 entries submitted. Response, lighter than expected, may be attributed to the high standards set by the Biophysical Society and the relatively late start of the program.

A $15,000 grant was made to the Educational Affairs Committee of the Biophysical Society for the preparation of biological examples of physical principles and laws for incorporation into physical textbooks. A committee is compiling questions and answers in a pamphlet which will be distributed to high school and college physics teachers.

An award of $15,000 was made to the University of Southern California for the establishment of a senior faculty position in biophysics to develop a research and training program in biophysics at USC.

Atomic Models Project

The Section's most important current effort is the atomic models project. This project, designed to facilitate research as well as teaching, will provide units for constructing models of various important molecules, such as genes, nucleic acids, proteins, etc. All parts, including 29 separate atoms, have been designed and final blueprints drawn. Fairly accurate cost estimates were secured from preliminary bids by three companies who can mold the units. Final bids are to be received on the entire job no later than February 1962. The project has the enthusiastic support of the NIH. Through underwriting of the major expense, approximately $160,000 for molds, plus other initial expenses, the average retail cost per atom will be brought to less than 20 cents.

General information on research and training in biophysics disseminated by mail and personal contact included more than 60 copies of the Summer Institute report to those requesting it. Project site visits afforded an opportunity to keep in touch with the field and to spread information on NIH grant procedures. The Section assisted in establishing a training program in biomolecular chemistry at Emory University and discussions at Johns Hopkins University may result

in initiating a study there of the feasibility of developing an electron microscope of two angstroms resolution. A talk presented October 27, 1961, at the Biomedical Engineering Conference in Omaha, Nebraska had as its subject the NIH as a support source and the philosophy of the BBC Study Section in reviewing grant applications for instrumentation support.

Cardiovascular Study Section

During the calendar year 1961, the Study Section reviewed 370 applications. Of these, 199 were recommended for approval and 155 for disapproval, with 16 deferred for project site visits or to await further information. A total of 20 project site visits were made in connection with giving adequate review. This compares with 341 applications reviewed during 1960, 204 recommended for approval totaling over $10-million, 137 disapproved, and visits to 17 medical institutions.

The Study Section is somewhat concerned with the rapid development of instrumentation in the field, and either held or cosponsored two informal discussions on such matters, inviting outstanding investigators in each field to discuss these developments and their implications with Study Section members. The first of these was held at Carmel, California, January 31. The topic for discussion was Blood Flow Meters and Their Uses. The information developed at this discussion was of sufficient value to have been accepted for publication in the supplement section of the Journal of Applied Physiology. The second discussion concerned telemetering of biomedical information and computer assisted analysis of such information, held September 14 in Washington, D. C. This also developed very interesting information for use of the Study Section and experts in the field.

Since these discussions have been useful, it is planned to hold approximately one each year to keep reviewers abreast of developments.

A need for some analysis of Cardiovascular Study Section activity and its relation to the overall programs of the Public Health Service has been felt during recent meetings. Plans are being made to arrange the regular workload so that a discussion of such matters can be made a part of the regular meetings.

Cell Biology Study Section

The Cell Biology Study Section saw the fruition in 1961 of a plan which has occupied much of its attention for more than three years. The American Society for Cell Biology, now organized with a charter and an elected Board of Directors, held its first annual meeting in Chicago in November with a membership of 750 biologists. The need for such a society was recognized as early as 1959, when at a meeting of the Study Section, three of its members were appointed to explore the possibilities. Drs. Morgan Harris, Elmer Butler and Hewson Swift called a meeting of cell biologists in January, 1960 at the Rockefeller Institute with another of our members, Dr. Keith Porter, as host. This and several subsequent conferences, aided by a grant from the Public Health Service, resulted in the formation of the new society. A second grant made possible the first annual meeting.

The Chicago meeting, attended by about 1300 scientists, clearly showed the usefulness of a society in which diverse approaches to problems of the cell can be presented, with an exchange of ideas impossible through the written word alone. Among the subjects discussed were problems of tissue culture in both animals and plants, of nucleic acid and protein behavior and synthesis, of cell division, of cellular metabolism and differentiation, and of the fine structure of the cell as revealed by electron microscopy and other refined optical methods. The cells under discussion ranged from Protozoa and slime molds to those of the flowering plants and vertebrate tissues, bringing together a group of scientists of very diverse backgrounds.

The meetings were conducted under the leadership of several Cell Biology Study Section members, Drs. Keith Porter, Hewson Swift and Heinz Herrmann serving in key positions, with a former Study Section member, Dr. Don Fawcett, as the newly-elected president. This healthy new society cannot fail to give valuable service to the field.

The Study Section also interested itself during 1961 in the needs of marine biological stations where forms of life and environmental situations offer unique material for the solution of problems of cell biology. In March, 1961, a visit was made by a Study Section member and a staff member to the University of Hawaii where a small marine laboratory is in operation on Coconut Island. A visit to the University of Washington Marine Laboratory at Friday Harbor was made in September by six Study Section members and three of the staff of the National Institutes of Health, and in December, the Executive Secretary visited the Oceanographic Institute of Florida State University at Alligator Point on the Gulf of Mexico. The needs are many - for equipment, for scientific leadership, and even for more marine laboratories. This situation will continue to hold the attention of the Study Section in future months.

Dental Study Section

During calendar year 1961 the Dental Study Section continued its activities designed to stimulate dental research. In order to permit Study Section members to contact institutions with developing research programs, the April meeting was held in New Orleans and informal conferences were held with personnel of several institutions in that area. Continued emphasis was given to contacts with interested investigators in non-dental environment, and as a result the Dental Study Section reviewed applications from Schools of Agriculture, Medicine, Arts and Science, and numerous hospital laboratories.

The Dental Study Section's desire to support a series of conferences on areas of especial interest led to a conference in September, 1961 at the Indiana University Medical Center on adhesive dental restoratives. Directed by members of the Study Section, this "workshop" was attended by 28 experts from various basic and clinical disciplines, and resulted in a series of preliminary recommendations for the guidance of future efforts. Proceedings of the conference will be given wide distribution to dental schools, industrial, and governmental laboratories.

The National Advisory Dental Council at its June 1961 meeting approved expenditure of funds for support of a Study Section-sponsored international

conference on the salivary glands. It is planned to invite approximately 40 experts to participate, including about 15 foreign scientists, for a three-day session at Seattle in August, 1962. This conference will encourage an exchange of ideas between oral pathologists and physiologists on the one hand and enzymologists, histologists, biochemists, and cytologists on the other.

Also during 1961 a series of planning conferences was held by Study Section members which is expected to lead to a request for NIH support of a Study Section-sponsored Conference on the Neurophysiology of the Oral Cavity. Numerous workers from the classical disciplines and from clinical dentistry have expressed an interest in participating, and a session of value to dental research is expected.

In order to formally articulate program goals, it is planned to establish a standing subcommittee of the Study Section which will be charged with developing ideas for future efforts and presenting them for consideration.

Endocrinology Study Section

The scope of programs involving the preparation and distribution of pituitary hormones and radioactive steroids under the sponsorship of the Endocrinology Study Section increased during 1961. Human growth hormone, follicle-stimulating hormone, luteinizing hormone, prolactin and bovine growth hormone have been isolated in highly active form and distributed to research establishments throughout the world. This aspect of the program is proceeding nicely through the vigorous activity of Dr. Alfred Wilhelmi of Emory University, Georgia. The number of requests for pituitary hormones continues at a rate of about 300 annually.

Urinary gonadotropin of high potency has been prepared by Dr. Alexander Albert of the Mayo Foundation, under an NIH grant, and plans for world-wide distribution of this material as a standard have been initiated.

An International Conference on Neuroendocrinology was held at the New Everglades, Hotel, Miami, Florida, December 6-8, 1961. Approximately 300 persons attended, including 40 active participants. A grant for support of this symposium was awarded by the National Institute of Neurological Diseases and Blindness in 1960.

An International Work Congress on the Assay and Chemistry of Pituitary and Urinary Gonadotropins was held in Gatlinburg, Tennessee, December 3-5, 1959. Proceedings of this conference were published in book form, "Human Pituitary Gonadotropins."

Approximately 400 applications for grants in aid of research are reviewed annually by the Endocrinology Study Section, with resultant recommendations being made to respective Councils.

Experimental Psychology Study Section

During the calendar year 1961, the Experimental Psychology Study Section reviewed a total of 203 applications of which 66 percent were given favor-

able recommendations.

This compares with a total of 184 applications reviewed during the calendar year 1960, of which 70 percent were recommended favorably.

In line with increased activities and to broaden the Section's competence and viewpoint, three members were added, bringing the total membership to 14.

A change also resulted in the office of Executive Secretary upon the resignation of Dr. Clark J. Bailey to become associated with the Foundations Fund for Research in Psychiatry at Yale University. He was succeeded September 1 by Dr. Seymour H. Baron, a research psychologist who had served with the Mental Health Institute since 1959.

General Medicine Study Section

In the calendar year 1961 the General Medicine Study Section reviewed 271 research grant proposals. Of these, 35 dealt with various phases of collagen disease, 99 were gastroenterological proposals, 95 were internal medical studies dealing mostly with endocrinological and other metabolic disorders, and 42 were dermatological projects. Of the total number of proposals, 49 percent were recommended for approval, 46 percent for disapproval and 5 percent were deferred for further study after initial review.

Of the four general medical categories cited above, the dermatological and internal medical proposals showed a trend towards increase in number. The proportions of collagen disease and gastroenterological projects declined slightly.

During the year the section joined with the Dermatology Training Committee (NIAID) and the Committee on the Cutaneous System of the National Research Council in planning a symposium dealing with fundamental research in the dermatological field. A steering committee representing the three groups has been formed to plan the details of this meeting which is to be held in the late spring of 1963.

Genetics Study Section

In September 1961 the Genetics Study Section completed the first phase of a work study program and collateral activities designed to aid in the sound growth of genetic research and the development of medical genetics in its broad aspects. In addition to the review of applications for research grants, the Study Section placed emphasis on the following activities which it felt would provide effective and realistic assistance to the field.

1. Current Research Methodology in Genetics --- In three symposia, the last two of which were held in 1961, current methodology in medical genetics was summarized and presented for publication by leading geneticists from the U.S. and foreign countries. The three separate volumes of the series deal with methodology in: 1) Human Genetics, 2) Mammalian Genetics,

and 3) Basic Genetics, respectively, and include advances in research techniques, special procedures, information on genetic stocks, equipment sources, etc., for each area. The series is entitled "Methodology in Medical Genetics", and is being published by the Holden Day Publishing Company, San Francisco. The program has been carried out with the support of the Division of General Medical Sciences under research grant RG-7097.

2. Expansion of Genetic Research --- a) Interagency liaison is carried out on a continuing, mutually helpful basis, especially with the National Science Foundation and The Atomic Energy Commission which also have a particular interest in the support of genetic research. Efforts are presently being made to establish a similar interchange of information in the area of genetics with the National Aeronautics and Space Administration. b) The Study Section's efforts to strengthen genetic research and encourage sound expansion in the area of human genetics have also been coordinated with genetic program development of the various Institutes. For example, a joint meeting of the Genetics Study Section, DRG, and the Genetics Training Committee of DGMS was held in May. Problems common to the development of research and training in the field were considered and the meeting resulted in agreement on the most urgent needs with specific recommendations regarding these. There is a continuing effort to aid the development of new genetic centers and to strengthen existing departments and laboratories.

3. Genetic Literature --- Facilitation and dissemination of research results in practical and useful forms has also been a major consideration. A Citation Index for genetic literature is being developed for publication on an experimental basis.

4. Research Manpower in Genetics --- As a result of a study of the research manpower in genetics, from information supplied by the National Science Registry and the American Institute of Biological Sciences, the Study Section has compiled a useful Directory of Geneticists in the United States.

5. Genetic Stocks --- In cooperation with the Genetic Society of Americans Committee for the Preservation of Genetic Stocks, this Study Section assists in the continuous review and assessment of needs for genetic stocks in areas of special concern to medical genetics and the National Institutes of Health.

given the study section and its predecessor, the Ad Hoc Committee on the History of Medicine, an unusual over-view of the growth and developments in the field. The still relatively small number of applications as compared with the workloads of other study sections, has permitted time for a very thorough review of all applications by each member of the study section.

On several occasions during 1961 members of the study section, either individually or as a group were called upon for special consultative services to the National Institutes of Health.

In January 1961 the study section, as a whole, was requested by the Division of General Medical Sciences to nominate 20 historical figures who would appear in a series of commemorative United States postage stamps honoring outstanding men and women for their contributions to medicine.

During 1961 final arrangements were concluded through the award of a planning grant to Dr. George Rosen of Columbia University, one of the members of the study section, to develop the necessary documentary and organizational bases for an historical study of the growth and expansion of research in the health sciences, of the changing role of the federal government in relation to research and training in the health fields, and of the changes in public opinion and attitudes toward such activities. A major focus for this study is to be the National Institutes of Health.

Human Ecology Study Section

In its first full year of existence, the Human Ecology Study Section reviewed 158 applications of which only 48, (or 30 percent), were recommended for approval. The Section is aware that the study of health and disease in community settings is a relatively recent development in medical research, and is anxious to explore possibilities of improving the quality of research proposals in this area. Discussions on this problem are under way.

The scope of the research considered by the Section in 1961 is reflected in the fact that applications from all of the Institutes and the Division of General Medical Sciences have been reviewed by the Section. Aside from diversity in disease orientation, however, the majority of these applications have also been multi-disciplinary in approach. In addition to the medical epidemiologists, sociologists and biostatiscians on the Section, a geneticist, cardiologist, and psychiatrist were added during the year.

Human Embryology and Development Study Section

During the calendar year 1961, the Human Embryology and Development Study Section reviewed a total of 285 applications requesting $23,127,920. Some of these included requests spread out over a period of seven years. Of these, 157 applications in the amount of $7,458,948 were recommended for approval by the Study Section, representing 55 percent of the applications reviewed and 32 percent of the amount requested.

In June 1961, the Chairman of the Study Section obtained a grant, recommended by the National Advisory Health Council, in the amount of $5,750

Section advises the Division of Research Grants and the Heart Institute on current deficiencies in supplies of lipid materials and on possible approaches toward filling these needs. Now available to qualified investigators are packages consisting of either (a) four mixtures of pure fatty acid methyl esters, or (b) eight purified individual unsaturated methyl esters. The Subcommittee is currently evaluating the adequacy of supplies of radioactive lipid materials.

Acting after repeated discussions by the Study Section and with the encouragement of the National Advisory Heart Council, the Study Section Chairman, Dr. E. H. Ahrens, Jr., called a meeting of a group composed of experts in a variety of public health fields, whose work is related to but who are not closely involved in studies in the heart disease field. This group discussed the importance of attacks on problems concerning various metabolic factors in coronary heart disease, including such influences as diet, exercise, emotion, endocrines, genetics, pharmacologic agents, and the like. While the members expressed their desire to continue and to extend their discussions in depth, it was realized that these would overlap somewhat with the activities of other groups in this area who had started development of active diet and drug studies after initial steps had been taken toward formation of this committee. It was therefore felt that further discussions would best be abandoned by this group.

Nursing Research Study Section

An assessment of the present status of knowledge about predictors of success of students in nursing schools and predictors of success in various nursing activities, stimulated by the Study Section because of its need for the information, was completed during 1961. A report of the findings was made available to the Study Section and to investigators who have shown an interest in such problems.

The desire of the Study Section to see more clinical emphasis in nursing research, and to see such research related to the patient care context of which it is a part, led to the formulation of plans for a joint meeting with the Health Services Research Study Section in April 1962 for a discussion of needed research in the patient care area.

The Study Section is reviewing an increasing number of applications in which the investigators plan to evaluate the use of closed circuit TV and programmed instruction for teaching some aspects of clinical nursing. In addition, the Study Section has expressed an interest in exploring the potentialities and limitations of closed circuit TV as a tool for nursing research. Accordingly, arrangements have been made with the Nursing Service of the Clinical Center for a demonstration at the January 1962 meeting of the use of closed circuit TV in clinical areas.

The Study Section has had a long standing concern about the scarcity of nurses who are capable of scientific investigation, and a belief in the importance of creating, in university schools of nursing, environments which will encourage research interests of students and provide opportunities for them to learn to do research under the tutelage of an experienced researcher.

Project Visits

This year visits were made to two projects which the Study Section had recommended for support previously and which were for the purpose of stimulating and assisting faculty to do research in nursing, and the Study Section was apprised of the developments which had taken place and the problems which have been ecountered.

Another contribution to the Study Section's approach to problems of research development in nursing was a report of the experience of the social work profession with research development programs. This report was presented by a member of the Study Section who had been involved in one of these programs for several years and who is familiar with the experience of other institutions with similar programs. The Study Section continues to welcome the opportunity to review projects which are oriented to this problem.

Pathology Study Sections A and B

Separation of the Pathology Study Section into two groups was formally authorized June 25, 1961. Arrangements were completed October 30, 1961, the Sections being designated as Pathology A and Pathology B.

During the year the Study Section reviewed a total of 580 requests, recommending approval of 359, or 62 percent. Project site visits were made to 54 laboratories in connection with 56 applications. This compares with 444 requests reviewed during 1960 of which 326 or 73 percent were recommended for approval, and with 64 project site visits.

The year's programming efforts were highlighted by a symposium, Horizons for Research in Neuropathology, at the University of Vermont, June 25-28, 1961. This was a teaching conference with 165 students, largely drawn from the resident and instructor levels, and a faculty of 31, drawn from a variety of fields of study related to diseases of the nervous system. The symposium was organized by a Committee chaired by Samuel P. Hicks, M.D., of the Study Section. Other members were George Margolis, M.D., of the Neurological Science Research Training Committee, Alfred Pope, M.D., of the Neurology Field Investigations Committee, and Harry M. Zimmerman, M.D., of the Pathology Training Committee. The symposium was supported by grant B-3187, N.S.S.

A Workshop on Radiation Methods in Pathology was arranged for the Study Section at Oak Ridge, Tennessee, on May 4, 1961, by Arthur C. Upton, M.D., and members of the staff of the Oak Ridge Institute of Nuclear Studies and of the Biology Division of the Oak Ridge National Laboratories.

The Committee on Analysis of Training for Research in Pathology, a joint effort of the Pathology Study Section and the Pathology Training Committee, working through the Intersociety Committee for Research Potential in Pathology, is engaged in a survey of present research workers and their training backgrounds. The discovery that post-World War II conditions were a dominant factor in the choice of research training opportunities in pathology has forced an extension of some aspects of the survey to cover more recent graduates. This project is supported by grant 2G-313.

An exhibit, Research in Pathology, stressing the role of the National Institutes of Health in developing the field, was shown at the meetings of the Federated Societies, the International Academy of Pathology and the American Association of Pathologists and Bacteriologists. Funds for its preparation were provided through 2G-313.

An informal Conference of Midwest Chairman of Departments of Pathology, has been arranged in Chicago for December 1, 1961, by Robert W. Wissler, M.D. This is expected to be the first in a series of regional conferences designed to provide Department Chairmen with up-to-date knowledge of the possible role of the National Institutes of Health grant programs in supporting research and research training. Attendance by some 22 visitors is expected. This will be a self-supporting conference. No grant funds have been requested.

Pharmacology and Experimental Therapeutics Study Section

The Pharmacology and Experimental Therapeutics Study Section reviewed 255 applications during the calendar year 1961 and recommended 169--or 66.3 percent--for approval.

The Section continued to concern itself with the need to stimulate and encourage research in the various areas of this discipline and to focus attention on the new advances in this field. In keeping with this concern, the Section has held preliminary discussion on various subjects for a symposium.

Among topics under discussion were: The effects of drugs on mammalian tissue cells of known, genetically inherited characteristics; biochemical aspects of drug toxicity with emphasis on the different routes of metabolism in acute and chronic toxicities; the influence of genetics on metabolic pathways; and the biochemistry of steroid hormones.

Additional topics will be reviewed before the Study Section chooses one for a symposium.

Physiology Study Section

During the year 1961 the Physiology Study Section reviewed 359 research grant applications of which 231 were recommended for approval, 89 for disapproval, and 39 were deferred for additional information or for project site visits. The Section undertook no special projects or activities but concerned itself with the review of research grant applications and with discussions on such problems as support of foreign research grants, possible imbalances in the support of certain research areas, and the need for more critical investigations in some fields of physiological research.

The September Physiology Study Section meeting was held at The Johns Hopkins University School of Medicine with one afternoon devoted to visiting various physiology laboratories and discussions with the investigators. Combining the meeting with visiting and examination of facilities for physiological research was considered to be a highly satisfactory experience.

Psychopharmacology Study Section

During 1961 the Psychopharmacology Study Section reviewed 220 applications for research grants compared with 140 for the previous calendar year. At the three meetings held during the year, the approval rate varied from 43 percent to 49 percent. In all, 101 applications were recommended for approval, a percentage of 46.

During the early part of the year it was noted that the Section was receiving increasing numbers of applications on biological tests of schizophrenia, and, since this is a controversial area of research, the Section felt that it would be helpful for a subcommittee of the Study Section to meet along with several of the investigators in this field to discuss its status and to exchange information.

It was felt that such a discussion would enable the Study Section to assume a more firmly-founded stance with respect to potential research having to do with "schizophrenic serum" and other biological tests of schizophrenia. The meeting of this subcommittee was held April 19, 1961, the day before the Study Section meeting in the spring, with 18 attending. The Section felt that this meeting was successful and that findings of biological substances discriminable in psychotic patients were now emerging in several independent laboratories, thus providing a basis for support of further research.

Surgery Study Section

During the calendar year 1961 the Surgery Study Section reviewed a total of 425 applications of which 232 were recommended for approval, 179 for disapproval and 14 for deferral. The total number of applications reviewed in 1961 represents an increase of more than 30 percent over the number reviewed in 1960. Fourteen project site visits were made during the year by Study Section members.

The third revision of the brochure The Dog in Medical Research was developed by the Section and was published as PHS Publication No. 312. The new brochure has been given wide distribution. There has been a large demand for additional copies.

Proceedings for the Conference on Prosthetic Valves for Cardiac Surgery held September 9-10, 1960 in Chicago were published in the form of a 586-page bound volume by the Charles C. Thomas Co., Springfield, Illinois. The conference was sponsored by the Surgery Study Section with grant support from the National Heart Institute.

The Section undertook a study of the criteria followed by DGMS for the awarding of training grants in the field of surgery. Recommended changes, aimed at providing more financial assistance to specially talented young surgeons to encourage them to enter academic and investigative fields, were developed by the Section and submitted to the DGMS for consideration by the National Advisory Health Council.

Because of the greatly increased number of research grant applications

in the field of surgery, the Division of Research Grants divided the Surgery Study Section into two parallel but independent sections designated as Surgery Study Section A and Surgery Study Section B. The two new sections were formally established in October 1961.

Toxicology Study Section

Ninety applications were reviewed by the Toxicology Study Section during the calendar year 1961, of which 59--or 65.6 percent--were recommended for approval.

The Section has continued to formally and informally encourage research in those areas of environmental health which encompass food additives, both intentional and adventitious, pesticide residues, and insect resistance to chemicals.

Individual members have attended various national and regional meetings to discuss with professional personnel the need for research in these areas. In addition they have attended meetings to explain to the general public the extreme precautions which industry and government cooperatively take to assure the safety of food and food products.

Study Section meetings have been arranged to coincide with meetings of national societies so that members could explain the Public Health Service's interest in their research areas.

Tropical Medicine and Parasitology Study Section

Tropical Medicine and Parasitology Study Section activities throughout 1961 continued to reflect its interest in encouraging better oriented, more inclusive interdisciplinary research in all fields of tropical (geographical) medicine. Applications have been reviewed from specialists conducting research around the globe and from the Arctic to the Antarctic.

During 1962 the Study Section plans to sponsor two conferences:

1. Second Conference on Research Needs in Bat Rabies
2. Panel Workshop on Immunodiagnosis of Helminth Infections

Additional conferences are planned for subsequent years.

Members of the Study Section who have received professional honors or awards during 1961 and 1962 are: Drs. Clark P. Read, Nevin S. Scrimshaw, Elvio Sadun, Gustave J. Dammin, and Ernestine B. Thurman.

Virology and Rickettsiology Study Section

Activities within the Virology and Rickettsiology Study Section continue to increase with the broadening parameters of virus research.

During 1961 a total of 268 grant applications were reviewed with 201 or 75 percent recommended for approval.

Recent advances in knowledge concerning intracellular and protein

changes in viral infections offer promise of solutions for some of the public health problems of virus infections and cancers of possible viral etiology. Respiratory agents and infections, viruses and tumors, as well as arthropod-borne virus and plant-virus problems make up the major share of the research programs.

A large proportion of applications are concerned with basic studies on host cell-parasite relationships and on nucleic acid or protein replications, metabolism, and functions in the infectious or tumorogenic process.

Acquisition of needed knowledge as well as its application in actual practice continues to receive attention. In response to the need to consolidate information on the arthropod-borne virus problem a resolution was adopted by the Section during April, calling for NIH support of existing efforts by the formation of an Arthropod Virus Committee. This group, similar to the previously formed Adenovirus and Enterovirus committees, will assemble information, standardize reagents, and coordinate research efforts on the approximately 150 arbor viruses now recognized.

The rapid accumulation of knowledge concerning the newer respiratory viruses and associated illness also creates problems of coordination and effective utilization. Recognition of this led to initiation of and support for an International Symposium on the Newer Respiratory Disease Viruses. Preliminary planning for the meeting to be held in the Fall of 1962 was completed and a tentative program formulated. Participation by several hundred persons, including authorities in the respiratory field from all parts of the world, is anticipated.

The Study Section sponsored an International Conference on Measles Immunization in Washington, D. C. in November 1961. This highly effective conference reviewed developments in the epidemiology, etiology and prevention of measles infection.

Serial No. DRS-1

DIVISION OF RESEARCH SERVICES

Summary of Program Activities
Calendar Year 1961

The Division of Research Services, which employs approximately 1000 persons with almost 200 individual occupational skills, provides scientific, technical, and engineering services to support and further the research programs of the National Institutes of Health. The Division is composed of an Office of the Chief and eight branches: Computation and Data Processing, Environmental Services, Instrument Engineering and Development, Laboratory Aids, Library, Medical Arts and Photography, Plant Engineering, and Research Facilities Planning.

DRS Programs -- 1961

Operated and maintained all NIH buildings, utilities, and grounds, and installed and helped maintain various types of equipment.

Provided design, engineering, and construction services for the comprehensive NIH building and remodeling program.

Coordinated the planning of all construction and remodeling work, and conducted engineering and architectural studies to assure the orderly development and growth of NIH facilities.

Provided consultation services to universities, hospitals and other private organizations engaged in planning new medical facilities.

Provided photographic, art, library, and translating services to all of NIH.

Produced and supplied laboratory animals and media for use in NIH research.

Provided comparative pathology services for the control or eradication of diseases in laboratory animals.

Provided veterinary services, including diagnosis, surgery, X-ray, and animal quarantine, in support of NIH research projects.

Designed and fabricated scientific apparatus, glassware, electronic equipment, and medical and surgical instruments not obtainable from commercial sources.

Designed, tested, and maintained mechanical apparatus for research, clinical, and office needs.

Designed, installed, maintained, and tested electrical, water, waste disposal, and other utility systems throughout NIH.

Washed, sterilized, and repaired NIH laboratory glassware.

Studied and improved all aspects of environmental health and sanitation at NIH, including food service facilities, air pollution, and insect and rodent control.

Provided various engineering and specialized services in support of germfree animal investigations at NIH.

Provided centralized computation and data processing services in support of NIH research and administrative programs.

Sponsored, conducted, and participated in job-related training courses covering a broad spectrum of employee occupational skills.

Accomplishments

Construction

The Dental Research Building and the General Office Building were completed and occupied during 1961. Construction continued on the new Surgical Wing to the Clinical Center, the National Library of Medicine, and the second extension to the Air Conditioning Plant. Preparation of designs for the NINDB/NIMH Building, the NIH Animal Center facilities, the new Surgical Wing reservation items and instrumentation, and the Master Utilities Plan #2 were begun. The Master Plot Plan for the NIH reservation was revised during the year. Preparation was begun on programs of requirements for an extension to the General Office Building and for the Gerontology Building (Baltimore, Maryland).

Through its Research Facilities Planning Branch, the Division continued to maintain close liaison with construction activities at the National Library of Medicine because of NIH's future responsibility to provide operation and maintenance services for the building.

Computer Program

A Honeywell-800 computer was installed in the Computation and Data Processing Branch in September, and was accepted in November. In preparation for the new computer, an intensive staff training and development program was undertaken, and interested Institute personnel were instructed in the principles and problems of programming for the new computer, and in its operation. The success of the staff training program is reflected by the fact that the Computation and Data Processing Branch was able, during the period of transition to the new computer, to continue its normal workload with a gradual increase in productivity. The Honeywell-800 will become completely operational in early 1962.

Controlled Maintenance

During the past year, the Plant Engineering Branch began to experience the first significant benefits of the reorganization that has been carried out over the past several years. As a result of the new Controlled Maintenance program, work processing time was decreased from 30% to 40%, while the workload was increasing about 45%. There was a more than 70% increase in work output, constituting a savings of approximately $600,000 a year.

Training

The volume of in-service and out-service training of Division employees remained at the high level attained during 1960. Approximately 150 employees attended job-related courses offered by universities and industry. Some 40 supervisory employees attended the Division's course in management concepts and techniques. The nine-month course in refrigeration and air conditioning begun by the Plant Engineering Branch last year was continued. Of particular significance was the attendance of 14 of the Division's engineers at a course in the biomedical disciplines held at Georgetown University. The course was developed through consultation between the Research Facilities Planning Branch and the Georgetown University School of Medicine.

Organizational Changes

There were several major organizational changes in 1961 designed to strengthen the Division's ability to respond to the changing needs of NIH research programs.

1. Two Assistant Chiefs were assigned to the Office of the Chief, Division of Research Services: one responsible in a staff capacity for the engineering and laboratory aids functions of the Division; and the other, responsible in a line capacity for computation and data processing, library, and medical arts and photography functions. These changes reflected a recognition of the need to strengthen the Office of the Chief because of the growing complexity and size of the Division's programs.

2. During 1961 the Sanitary Engineering Branch was reorganized as the Environmental Services Branch, in response to the changing needs of NIH for environmental services. All sanitation and biological activities were consolidated and placed in one Section of the Branch and all engineering functions were placed in another. Routine service functions which had previously required the facilities and resources of the Branch were turned over to other organizations, thus making it possible for the Branch to devote its energies to activities of a non-routine nature.

3. In response to the growing need to break down the engineering projects of the Instrument Engineering and Development Branch by fields of specialization, the engineering activities of the Branch were reorganized during 1961. The existing Instrument Engineering and Design Section was reorganized into three Sections: The Engineering Development Section, the Electronics Engineering Section, and the Mechanical Engineering Section.

This change is expected to provide a higher quality of output and more satisfactory working conditions for the engineers of the three new Sections. It will allow each engineer to obtain experience and knowledge in depth in his field of specialization.

NIH Animal Center

Progress was made during the year on the planning and design of permanent buildings at the NIH Animal Center near Poolesville. In addition, operation of the Center on an interim basis was achieved through renovation of existing farm buildings, erection of pasture fences, and construction of temporary dog kennels. Most of the activities previously conducted at the Rockville Farm, plus a major share of the dog quarantine and holding services for NIH, were transferred to the new Center. During 1962, plans will continue for the second phase of the construction program, which will provide facilities for animal behavorial studies and for caged animals, such as monkeys.

Production of Specific Pathogen-Free and Germfree Animals

In preparation for the central production of specific pathogen-free and germfree animals for NIH research, design work was completed on the conversion of buildings T-18 and T-19 from office space to animal quarters. In addition, progress was made in the development of foundation breeding colonies and in the training of personnel competent to carry out the complex technical procedures required to produce these highly specialized laboratory animals.

Problems

The major continuing problem that has confronted the Division since its establishment in 1955 has been that of adjusting to the rapid growth and constant reorientation of the NIH research programs. There has been an inevitable time-lag between major program changes and an effective Division response to those changes. Much of this lag results from the fact that increases in the Division's funds over the years have not been phased with Institute increases. Although it is unlikely that the over-all problem will ever be totally solved, the Division has made a constant effort to mitigate its effects. This effort has taken two basic forms: First, the improvement in communications between the various DRS branch programs and the Institutes they serve; second, a continuing program of strengthening DRS activities to meet changing research program requirements. The strengthening of the Division's programs has been reflected most significantly in the establishment of three new branches during the past several years, the reorganization of the remaining branches, and an intensive effort to recruit and retain competent professional and technical personnel.

Although much progress has been made, the ability to provide technical services quickly and effectively within the framework of requirements for economy will continue to be the major challenge facing the Division of Research Services.

TABLE OF DRS PROJECTS, 1961

Laboratory Aids Branch

Serial Number	Title
4.1	Prosthetic Replacement of the Femoral Head
4.2	Testing of Castiplast 11, 17 and 327 (Resins of the Epoxy Type) in Tissue
4.3	Study of Bovine Ocular Squamous Carcinoma
4.4	Surgical Lengthening of Long Bones in the Dog
4.5	An Abdominal Window for Viewing the Viscera of a Rabbit
4.6	Rumen Fistula Plugs for Goats
4.7	Mitosis of Mast Cells of the Rat
4.8	Focal Necrotic Hepatitis of Rabbits
4.9	Investigation of Diarrhea of Rabbits
4.10	Tyzzer's Disease of Mice
4.11	Chronic Respiratory Disease of the Albino Rat
4.12	A Survey of Mycotic Diseases in Domestic Animals submitted by the Communicable Disease Center, Kansas City, Kansas
4.13	A Study of Chronic Respiratory Disease in Rats
4.14	Investigation of the Problem of Urinary Bladder Stones in Mice
4.15	Fluorescein Amine Media for Rapid Differentitation of Staphylococci
4.16	A New Plating Medium for Rapid Disc Sensitivity Tests

Table of DRS Projects, 1961

Computation and Data Processing Branch

Serial Number	Title
5.1	Nonlinear Least Squares Fitting
5.2	The Use of Monte Carlo Techniques in the Simulation of Biological Systems
5.3	The Kinetics of Chemical Reaction of Migratory Systems
5.4	Calculation of Transients in Muscular Contraction

Instrument Engineering and Development Branch

Serial Number	Title
8.1	Design of Instrumentation System for the Operating Suites of Building 10-A
8.2	Automatic Device for Withdrawal and Recording of Nucleic Acid Samples
8.3	Portable Densitometer for Measuring Amount of Dirt Adhering to a Sampling Strip of Pellon
8.4	Five Barrel Glass Micropipettes
8.5	Radio Frequency Energy Effects on Biological Materials
8.6	Automatic Steroid Analyzer
8.7	The Conductive Plastic Membrane Electrode for Detecting Low-level ERG Signals of the Eye

December 1961 Calendar Year 1961

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH

DIVISION OF RESEARCH SERVICES

Summary of Branch Activities 1. DRS-2 Serial Number

2. PLANT ENGINEERING BRANCH 3. R. R. Holliday Branch Chief

Objectives and Functions

In brief, it is the mission of the Plant Engineering Branch to provide the central services listed below for the National Institutes of Health. The Branch goal is to provide adequate services while utilizing manpower and material in the most economical manner.

Operation and Maintenance: These services consist of operating, maintaining and repairing NIH physical, mechanical, electrical, architectural and landscaping facilities as well as maintaining and repairing laboratory and research apparatus.

Engineering: These services consist of developing and preparing plans and specifications for alterations, repairs and extensions to the existing facilities, administering and inspecting construction work performed by private contractors, and providing professional engineering services as required.

Construction: These services consist of altering, installing and fabricating facilities and equipment for research programs. In this capacity the Branch furnishes mechanical, electrical and architectural craft services.

Summary of Branch Progress

During the past four years the Branch has given special attention to defining its objectives and improving and expanding its organization, procedures, facilities, equipment, and personnel in order that the services provided the research effort keep pace with the rapid expansion of NIH.

The problem was one of developing a plant engineering service for the expanding NIH which would fully utilize personnel and facilities, provide an adequate level of service, and permit orderly expansion.

The program briefly included the following elements:

(1) A complete rearrangement of the Branch organization groupings. This essentially involved grouping the upper levels of organization by function and rearranging subordinate groupings by skills, time (shifts), geographical location or equipment.

(2) Consolidation of shop stores and establishment of inventory and storeroom procedures and controls.

(3) Physical rearrangement and consolidation of the central craft shops.

(4) Establishment of a formal work order system for all work, which basically includes a central point for receiving work, work authorization, planning and scheduling, labor dispatching, and reporting procedures.

(5) Establishment of a formal preventive maintenance system for inspecting facilities, generating maintenance work, reviewing, analyzing and establishing priorities for maintenance in accordance with maintenance standards and available funds.

Because of the tremendous size of the planning, organizing and implementing tasks and the pressures for services during the period, little improvement was realized from the effort until calendar year 1961.

During 1961 all elements of the program began to take shape except implementation of the preventive maintenance system and, of course, program refinements. Control reports, adequate to begin assessment of the program, were produced during the year.

Performance appraisal indicators or yardsticks for assessing the value of the program improvements are reported below.

Time To Process Work To Completion: One method of measuring performance is to appraise the change in the time required to process work through to completion. To date this appraisal has been made for two periods: October, November and December 1960, and March, April and May 1961. The appraisal includes major work which excludes minor central shop work and minor maintenance work.

Minor central shop work is defined as jobs which

(a) can be performed by a single craft skill

(b) require little or no supervision

(c) require no more than 16 craft manhours to complete

Minor maintenance work is work performed by area maintenance crews and is defined as jobs which

(a) are urgent minor maintenance which if neglected may disrupt the effective performance of NIH personnel or equipment (such as blown fuses, clogged drains, etc.)

(b) as a rule-of-thumb do not require more than 3 craft manhours to complete.

(c) do not have material costs in excess of $100.

Chart No. I, shown on page 2-4, entitled "Average Elapsed Days From Receipt To Completion of Major Work Orders by Job Size Categories" compares the results for the two periods. The abscissa indicates the work categories by job size, e.g., craft manhours. The ordinate indicates the average lapsed time in calendar days (from receipt of the order in the Branch to completion of the order) for all jobs received during the period. The chart shows a very significant decrease in processing time. For example, the average lapsed time for jobs in work category 81-120 craft manhours was 114 days for the earlier period compared to 68 days for the later period, an improvement of over 40%.

The continuity of the curve for the latter period also indicates improved scheduling procedures; e.g., the receipt to completion time is essentially directly proportional to the size of the job.

Only a small part of this improvement in job processing time resulted from an increase in manpower. The average personnel in the Shops Section during the first period was 157 compared to 167 for the later period, an increase of only about 6%. These personnel numbers include all shop personnel -- administrative, supervisory and craft.

It also is significant that the total workload measured by actual craft manhours employed on the work for both major and minor work increased about 45% during the later period.

Material/Labor Ratio: The comparison of the relationship of material to labor expenditures over a period of time provides an excellent picture of work performance.

Chart No. II, entitled "Material/Labor Ratio Summary", shown on page 2-5, shows the material/labor ratio trend for a five-month period beginning with the quarter ending September 30, 1960. As reflected by the chart, an increase in material costs per manhour of labor of 71% occurred during the 16-month period.

Materials Expenditure: Materials expenditure can be used as a yardstick to reflect production trends. Chart No. III, entitled "Material Summary", shown on page 2-6, shows materials expenditure in terms of numbers of issues and monetary value for five quarters beginning with July 1960.

The monetary values of materials for the five-quarter period increased from about $67,000 per quarter to about $130,000 per quarter, an increase of more than 94%.

The number of issues increased from about 9,200 to about 17,000, an increase of more than 84%.

Shop Work Backlog: A summary shop work backlog report is prepared in the Branch and released on Monday of each week. The report indicates the estimated backlog in weeks for individual shops (based on the shop staff) plus

AVERAGE ELAPSED DAYS FROM RECEIPT TO COMPLETION OF MAJOR WORK ORDERS BY JOB SIZE CATEGORIES

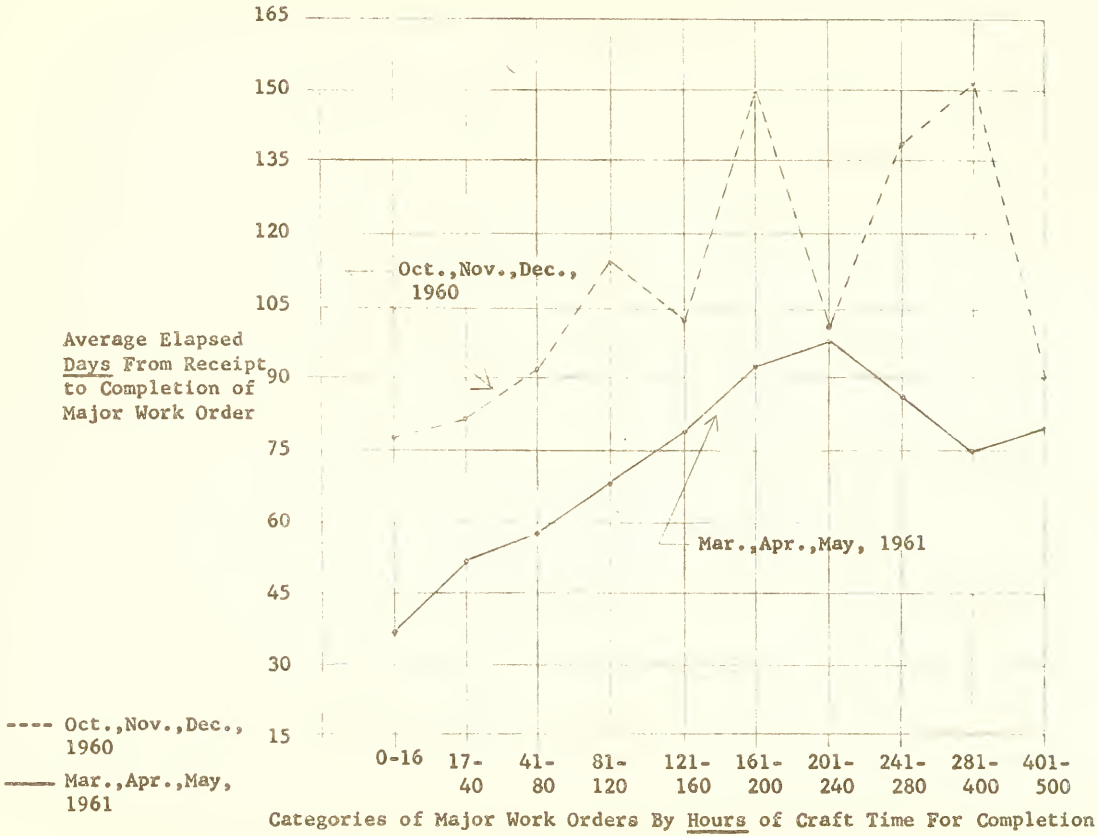

CHART NO. I

MATERIAL SUMMARY

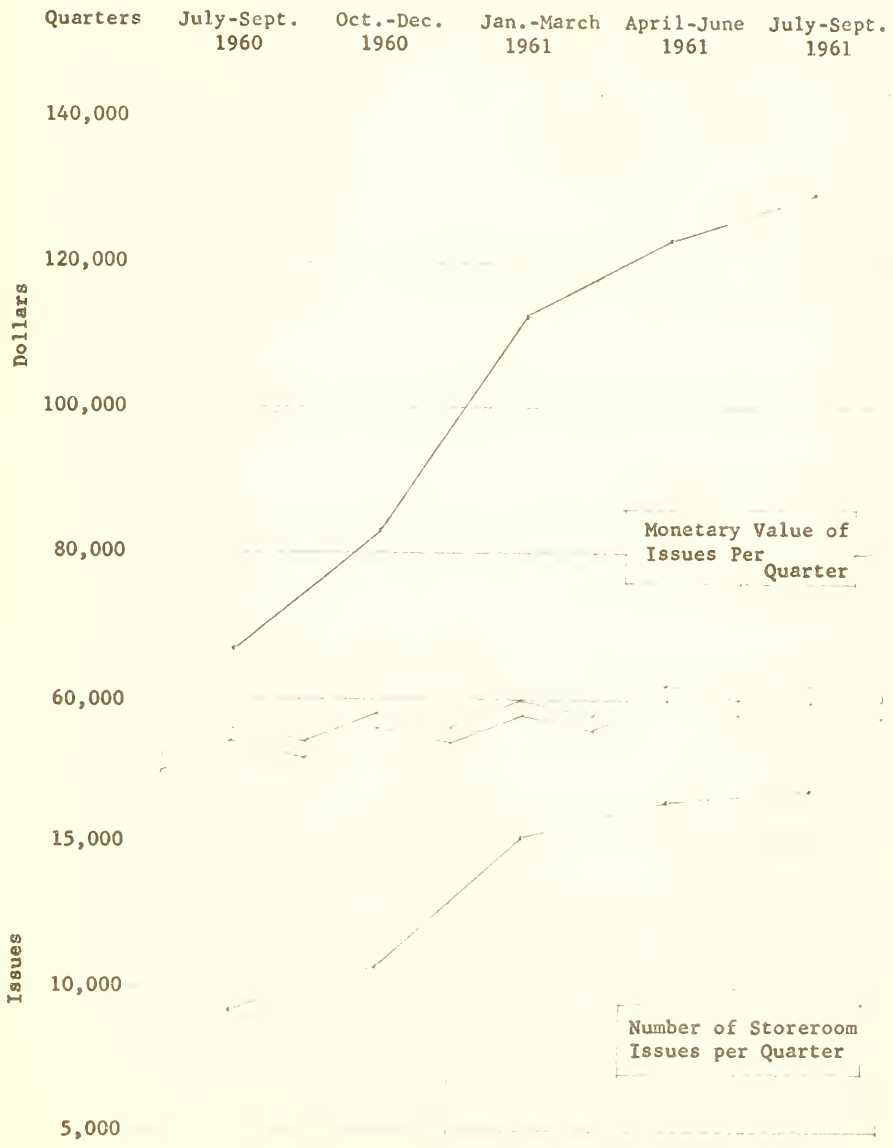

CHART NO. III

the estimated craft manhours of work in planning. A sample copy of this report, Chart No. IV, is shown on page 2-8.

Backlog reports were not available prior to implementation of the changes previously mentioned; however, Chart No. V, entitled "Shop Work Backlog Summary", shown on page 2-9, shows the average shop backlog trend since the week of February 10, 1961.

It can be seen from the chart that the backlog was being gradually reduced while the workload was increasing until early October 1961. In early October the load trend began increasing as a result of the large increase in workload occasioned by numerous moves from older buildings to new buildings and the resulting alterations and rearrangements in new buildings and in the areas released in older buildings.

Conclusions: A review of the foregoing performance indicators reflects an appreciable increase in work output over the period examined.

Work processing time was decreased in the area of 30 - 40% while the workload increased about 45%. Using the ratio of workload/work processing time as a work output indicator, and using the first period as a base, the ratio for the second period is 145%/60% = 2.4 (45% more work completed in about 60% as much time), an indication that overall work output more than doubled. This tends to be consistent with the increase in material used/manhour labor of about 71%, the increase in dollars of material used of about 94%, and the increase in material issues of about 84%.

These indicators reflect an increase in work output somewhere in the area of 71 - 100%. On a conservative basis an increase in output of 70% would reflect a savings of $570,000 per year. This is based on 70% of the central craft shop payroll of approximately $960,000 per year, with a deduction of $102,000 representing the salaries of six planner-estimators and approximately ten craftsmen who were added to the Branch staff.

Accomplishments

Architectural/Engineering Services for Design: In addition to the engineering work for maintenance and alterations performed by the Branch shops, new building construction and special engineering studies, plans and specifications were prepared during the year for over 150 maintenance and alteration projects performed by private contractors. A list follows of some of the more important of these jobs released during the calendar year.

Buildings T-18 and T-19: Conversion of Offices to Animal Space ($390,000): Building T-18 is to be modified only slightly to restore it to a typical animal facility. Building T-19 will undergo substantial renovation to provide for both Specific Pathogen Free and Germ Free animal programs.

Building 2: General Repairs and Renovations ($310,000): A general renovation of the laboratory and supporting utility facilities was designed

(Sample Copy)
SUMMARY
PEB
BACKLOG REPORT

Date November 10, 1961

	CATEGORY		CARP.	PLUMB.	METAL	PAINT	ELECT.	MECH.
A	Men available		37	16	21	20	33	18
B	Total manhours available in shops per week		1480	640	840	800	1320	720
C	Estimated absences (17%)		252	109	143	136	124	122
D	Total available M/hrs (B less C)		1228	531	697	664	1196	598
E	M/hrs reserved for minor work & SJO's		400	100	200	80	300	280
F	M/hrs reserved for single orders (D less E)		828	431	497	584	896	318
G-1	Present shop backlog	Weeks	4.1	2.8	4.5	4.6	1.4	3
		Manhours	3407	1227	2282	2778	1249	946
G-2	PCS backlog (Estimated)		1316	343	302	500	825	26
G-3	PCS backlog (Awaiting material)	Weeks	2.6	6.6	2	1.1	2.7	1.5
		Manhours	2146	2835	1002	639	2447	490
G-4	PCS backlog (Awaiting funds)		396	322	52	607	388	52
G-5	PCS backlog (unestimated)	Weeks	3.4	1.2	2.9	1.1	1.2	2.2
		Manhours	2780	534	1438	639	1057	698
G-6	EDS backlog		340	360	446	110	264	616
G-7	Total backlog (Manhours)		10385	5621	5522	5282	6210	2828
H	Total backlog (weeks)(G-7 divided by F)		12.5	13	11.1	9	6.9	8.9
	PREVIOUS BACKLOG REPORT		12.3	14.4	11.5	9.6	7.1	9

CHART NO. XV

SHOP WORK BACKLOG SUMMARY

CHART NO. V

in the early part of the year. Basically this design resulted from the transfer of personnel of the Dental Institute to their new building, and the assumption of this vacated space by personnel of the National Institute of Arthritis and Metabolic Diseases. Included in this design was a substantial alteration to the waste disposal system in the building which had been a problem for the past several years.

Building 8: First Floor and Basement ($151,000): A complete remodeling of the first floor and part of the basement was undertaken in this building to install permanent laboratory facilities with design detail specifically prepared for the occupancy of the National Cancer Institute.

Building 10: 4th and 12th Floors ($126,000): Laboratory facilities of the National Cancer Institute on these two floors were designed for renovation to suit new programs.

Building 14, Wing D: Enclosing Outside Monkey Runs ($101,000): Existing outside runs were designed for conversion to permanent enclosed animal facilities with particular design for the handling of monkeys.

Building 9: Enclosing Monkey Runs ($67,000): Exterior monkey runs were converted into permanent laboratory space for the National Institute of Mental Health.

Building 10: Conversion of Toilet Facilities ($50,000): Toilet facilities and locker space on the fourth and fifth floors of B corridor were converted into laboratory space for the National Cancer Institute.

Building 12: Surplus Property Area ($49,000): Warehouse space in the northeast corner of the ground floor in this building was converted to office space for the Division of Research Services.

Various Buildings, Roof Repairs ($36,000): Basic maintenance repairs were undertaken on several buildings around the reservation determined to be in the most critical need of immediate repairs. These roof, gutter and down-spout improvements are the first step in a larger program of repetitive roof maintenance.

Building 10: Lightning Protection ($20,000): A network system of air terminals and ground leads was installed to give permanent protection against lightning.

Architectural/Engineering Services for Studies and Surveys:

Benchtop Materials: Because of the high cost and long delivery problems associated with installation of chemical-resistant wood benchtops, a survey was made to find a readily available and less expensive material giving something equal in the way of chemical resistance to carbonized birch. To date, a number of samples have been tested for the Branch by the Environmental Services Branch for performance without any great amount of success. The problem is under continuing consideration by the Plant Engineering Branch and the Development Section, Research Facilities Planning

Branch. Examples of materials tested and being studied are (1) hardwood coated with epoxy or polyester resin coatings, (2) coreboard materials with applied coatings, or laminations of chemically inert materials such as teflon, (3) synthetic stone and thermo-plastic compounds.

Additional Floor Study, Building 13: A survey and engineering analysis was made early this year of the feasibility of adding a fourth floor to Building 13 to provide additional warehouse space. A cost estimate was submitted for consideration; structurally this addition was determined to be feasible.

Addition to Building 12: A survey was made to determine feasibility and cost of providing additional space in Building 12 by addition of a second floor plus extension of the building to the east. The second floor addition was determined to be feasible and a cost breakdown of this addition, plus the eastward addition to the building, along with an architectural rendering, was prepared for consideration.

Paints and Coatings: Continuing investigation has been made for suitable inexpensive and easily maintained coatings for wall and floor surfaces, with particular emphasis on the need for animal facilities. A few test installations have been made on some of these products to assess their worth under actual operating conditions. A similar effort has been made to find a suitable answer for a sanitation problem which occurs when resilient flooring is installed in buildings with structural facing tile walls having an integral cove at the floor. The integral cove of the wall is unsuited in radius and texture to the usual cove materials applied with resilient flooring and the depression left at the edge of the tile has posed a cleanliness problem for housekeeping. A current contract of this nature will try out what it is hoped will be the answer to this problem, i.e., heat-treating the resilient field tile and forming it to the cove at the work site. Use of special rubber or vinyl extrusions to meet the cove contour was discarded because of excessive cost.

Laboratory Furniture Drawings: New drawings have been developed for individual pieces of laboratory furniture on 8" x 10-1/2" sheets. These drawings have been improved to require that a certain tolerance be met in the manufacture of this equipment to eliminate problems encountered from various manufacturers not being consistent or standardized in basic dimensions. Similar drawings of this type have been developed for standard pieces of plumbing trim to reduce the engineering time required in preparing installation and contract details.

Automatic Doors, Building 10: Early in the year a study was made to determine what, if anything, could be done to reduce or alleviate the difficulty of opening the main entrance doors and the out-patient entrance doors in Building 10. It was determined that the problem is one of negative pressure in the building as well as external wind pressure. At the present time a more specific study is being made of the internal negative pressure problem to see how it might be reduced, not only to overcome the door condition, but to alleviate some other problems associated with negative pressure.

Incinerator Overhaul, Building 11: Design has continued and is nearing completion on the modification to the incinerator facilities to improve the conveying systems, ash handling system and the handling of contaminated waste. A design already has been prepared to repair the refractories inside the two incinerators which are in serious disrepair and need immediate attention.

Air Filter Maintenance and Selection: During the year, a survey was made of all the air filters at the National Institutes of Health to determine whether savings could be realized by having filters maintained by an outside contractor. The survey indicated that a small savings might be made. However, it was considered that control of air filter changing and air quality could better be realized if the filters were maintained by NIH maintenance personnel. The survey pointed up two additional important factors. One was the need to reduce the large variety of existing filters, some of which were classified as "Poor", by utilizing the results of tests made by the National Bureau of Standards and standardizing on a few types which met Government Specification FF310. This has resulted in a decrease in necessary stock items and an increase in air quality to many buildings on the reservation. The second was the need to prepare a standard guide on air filters which could be used by NIH personnel in the design of new facilities or modifications of existing laboratories. Consequently, an "Air Filter Selection Guide" has been prepared and currently is being reviewed and edited for this purpose. It reviews briefly the general purpose of air filters, classifies them in four groups, and makes recommendations for the selection of air filters for various types of laboratories and facilities at NIH. It also suggests methods for decontamination of filters and spaces.

Reclaiming Waste Paper: A survey was made to determine the feasibility of reclaiming waste paper at the NIH Incinerator Plant. Two types of baled paper could be reclaimed: they are (1) "corrugated" paper and (2) "clean-mixed" paper. It was found that approximately 1500 pounds per day of "corrugated" could be salvaged at an additional expense of approximately $13.75 per day, and approximately one ton per day of "clean-mixed" paper could be reclaimed at an additional expense of approximately $47.00 per day. With the present waste paper volume at NIH, salvage of waste paper would not be economical. The survey also revealed that an average of approximately 19 tons per day of material was received and consumed by the incinerator. Of this amount, approximately 65% was sawdust from cages and approximately 35% was paper and miscellaneous material.

Contract Administration Services: The Branch provided the administrative and inspection services for 196 maintenance and alteration projects being performed by private contractors. (Total cost - $3,278,771.) These services exceeded the previous year's services by 65% in terms of numbers of projects and by 256% in terms of total monetary cost.

In addition, the Branch inspected and assisted the Regional Office, Public Buildings Service, with the administration of five projects contracted for NIH. (Total cost - $796,120. One of the five, a project for renovating electrical distribution, cost $738,837.)

Work Performed by Station Labor: Central Shops: Jobs performed by the Branch central shops are classified as maintenance or alteration. Within these two categories they are classified further as either single orders or minor orders.

Single orders include all jobs except minor orders (jobs which are estimated to require less than 16 manhours craft time, require little supervision, and can be performed by a single craft).

During the first eleven months of the calendar year the shops completed 3,346 single order jobs; 2,551 of these were alterations, 795 were maintenance. These jobs vary in size up to jobs requiring 3,000 manhours of craft time and materials costing $5,000.

The shops also completed 4,486 jobs classified as minor orders during the first eleven months.

Area Maintenance: Minor maintenance work is performed by area maintenance crews. These jobs are defined as jobs which -

(a) are urgent minor maintenance which if neglected may disrupt the performance of NIH personnel or equipment.

(b) as a rule-of-thumb do not require more than three craft manhours to complete.

(c) do not have material costs in excess of $100.

The Branch processed an average of 1,200 of these jobs per week during the year.

Other Items of Interest

Grounds:

Landscaping: As part of a continuing program, plantings around Buildings 1 through 9 and Building 15K were renovated. Screen plantings were installed to soften parking areas at parking lots 4A, 20C and Central Parking Area, south of South Drive. Screen planting was started along Cedar Lane adjacent to quarters buildings. Completion of the planting and foundation planting for quarters buildings are scheduled for the spring of 1962.

A new method for establishing sod on high erosion water channels was developed during the year. A blanket of jute fibers impregnated with seed and fertilizer is staked on the slopes. The blanket prevents erosion until the new seed is well-enough established to hold the soil in place. This method has proven successful in the heavy surface water runoff area from Cedar Lane to the creek at West Drive.

Sidewalks: As part of the master walk planning, new 5' sidewalks were constructed from Old Georgetown Road along the south side of South

Drive to the intersection of Service Road West, and from Parking Lot 29 to Service Road West. Old bituminous walks were replaced with concrete at the south end of Building 5 and along West Drive from Center Drive to Cedar Lane.

Roads and Parking: In addition to routine surface and joint sealing programs, a major resurfacing job was accomplished in the service area between Buildings 11, 12 and 13. This concrete surface was spalled badly and was resurfaced over the concrete with bituminous asphalt. The service areas west of Building 13, west of Building 1 and several concrete parking areas will require a similar treatment in the next year or two.

Awards: Recognizing the value of employee participation in management, the Branch launched a concerted drive to stimulate employee suggestions through the awards mechanism. Containers for suggestion forms were installed in public areas throughout the Branch so that forms would be available readily to any employee who had a suggestion. Participation in the Awards Program was urged in virtually every issue of the PEB Newsletter, a quarterly issuance to all PEB employees. A system was set up whereby employees were kept informed of the status of their suggestions as they passed through various channels to the NIH Awards Board. Most importantly, awards for suggestions were presented to three employees of the Branch during the year. While this in itself was a modest enough beginning, the concrete proof of the value of a suggestion as evidence that the system is working stimulated submission of many more suggestions than had ever been received before. There are currently six additional suggestion awards which have been recommended for approval of the NIH Awards Board, and some 15 suggestions in various stages of processing prior to submission to the Awards Board with a recommendation for approval.

Personnel - Recruitment: As of December 19, 1961, the Branch had a total of 498 employees on duty, a gain of 58 over January 1, 1961. Actual net gain, however, did not keep pace with plans, which called for a staff of some 528 by the end of 1961. Nevertheless, the gain of 58 employees represents a 13% increase in personnel over the previous year, and is slightly more than the 12% gain registered in 1960 over 1959.

Thirty-seven of the 58 employees (64%), who came on duty in 1961, were recruited by the Maintenance Engineering Section. Most of these were fixed industrial equipment operators needed to operate the Dental Building, the Office Building, and the Surgical Wing of the Clinical Center, the major buildings which were completed and occupied during the year. Completion of these buildings increased the area of buildings maintained and operated on the NIH reservation by 19% and necessitated splitting the Buildings (operating) Unit into two separate units for more effective administration and supervision.

Most of the problems associated with trouble calls or minor work were solved by the recruitment of a full complement of representative craftsmen to the buildings operational units, and by reservation of selected craftsmen from the Shops Section for minor or incidental work of this nature.

Actually, a total of 106 employees entered on duty during the year,

an average of nine EOD's per month. This was offset, however, by 48 resignations (average 4 per month) for the aforementioned net gain of 58. Resignations, a relatively modest 10% of the 470 average on-duty's during the year, included six for retirement, 21 for transfer to other governmental units and five for military duty. Only 16 (3.4% of average on duty during the year) employees resigned to accept employment outside the government.

Training: In keeping with the policy of encouraging each individual employee to obtain as much job related training as possible, the Branch sponsored some 5,576 classroom hours (697 man days) of instruction during the year. This is a 239% increase over the 292 man days of training received by Branch personnel in 1960, and reflects not only an increased desire on the part of management to see that employees know their jobs, but an equal desire on the part of the individual employee to equip himself for all the demands of his job. Of the total training, 4,520 classroom hours were in professional, scientific or technical subjects, 924 classroom hours were in the field of management and supervision, and 92 classroom hours were devoted to clerical training. The remaining 40 hours were for general orientation. In terms of percentages of the total, this training was distributed as follows: 81% professional, scientific, or technical; 17% managerial and supervisory; 1.6% clerical and 0.4% for orientation.

About one-fourth of the training received by PEB employees was obtained in non-government installations. The remaining three-fourths was predominantly in-service (3,916 hours), although 304 hours were obtained in other government facilities.

Not only was the Branch active in taking advantage of training provided by others, but it also was active in sponsoring training where the need for it could not be met as well elsewhere. Of the 3,916 hours of in-service training, 3,308 hours were taught by PEB personnel. These included a course in air conditioning and refrigeration, a course in pneumatic controls, and a course in elevator repair and maintenance. The course in air conditioning and refrigeration began its second session in September. Offered solely for operating engineers of the Buildings Unit in the first session, the second session is being attended by students drawn from other units and sections of the Branch whose jobs bring them in close contact with air conditioning and refrigeration problems. This course has been meeting twice weekly for two hours per session.

In order to keep up with the latest developments in electronically controlled elevators, the Elevator Unit, Maintenance Engineering Section, began a 25-week course, offering two hours of instructions weekly to all employees of this unit in October, 1961. All members of the unit are participating.

A course in pneumatic controls was set up in November, 1961, to meet the needs of operating engineers for understanding the characteristics of controls of this type. The course is offered two hours weekly. About 25 have been in attendance each session.

Calendar Year 1961

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH

DIVISION OF RESEARCH SERVICES

Summary of Branch Activities

1. DRS-3
Serial Number

2. MEDICAL ARTS AND PHOTOGRAPHY BRANCH
Branch

3. Malcolm S. Ferguson
Branch Chief

Objectives

The Medical Arts and Photography Branch has been developed primarily for the visual documentation and communication of technical information. Its varied resources are applied to research programs in every Institute since camera and art procedures are invaluable in the analysis of clinical and laboratory observations. The Branch is alert to new techniques that will enhance its contributions to investigation and is responsive to the ever-increasing emphasis on visual means of studying complex biological phenomena. The close association between the Branch's artists and photographers and the research worker provides a stimulation that renders their work meaningful and rewarding.

Programs

The Branch offers clinical illustration, publications design, and museum mountings, the design and construction of scientific exhibits, the drafting of charts, graphs, and slides, varityping, and silk screen processing through the Medical Arts Section, utilizing some of these resources in the production of motion pictures; and provides motion picture footage, still photographs, photomicrographs, slides, and photographic enlargements, in color and black-and while film, through the Photography Section. It also provides consultation on fine and applied arts, as requested by the Institutes and administrative offices of NIH.

Summary of Progress

During calendar year 1961, the Medical Arts and Photography Branch completed more than 21,000 requests for services. For the Medical Arts Section, this combined production figure represents an 8-percent increase in individual service requests over 1960. For the Photography Section, the increase was 28 percent, and represents a larger number of requests for all services except color transparencies.

Progress and Accomplishments

Medical Arts. Twenty-four exhibits were completed within the year, and nine exhibits from earlier years were updated. Three exhibits received special commendation at scientific meetings. Lower-cost, lightweight exhibits were

introduced in 1961, utilizing a variety of contemporary materials and design methods. The new style is achieved with translucent plastic panels, illuminated by fluorescent backlighting, and mounted on aluminum frames.

The silk-screen equipment acquired in 1960 is proving to be a convenient and versatile system even though the present installation is not permanent. The equipment is in almost constant use and is being applied to many projects that could not have been accomplished for lack of sufficient manpower.

Preparation and maintenance services for the Clinical Pathology Department's museum of pathological specimens in the Clinical Center has been improved to insure that this permanent collection of plastic-embedded, three-dimensional records is maintained in the best possible condition.

A machine for vacuum forming of plastic sheets has been installed for use whenever lightweight, inexpensive, or duplicate plastic models are required. Molds can be in sizes as large as 36x30x6 inches.

The expanded drafting service now prepares certain types of technical illustrations which are particularly well-suited to publication and lecture slides. Simplified technical drawings are reproduced from photographs that are too cluttered in their original form for quick and easy understanding. The resulting illustrations combine the accuracy and proportions of a photograph and the conciseness of line drawings.

Illustrations of the normal ear drum and subsequent viral infection of this area were drawn from prisoner volunteer subjects in the Clinical Center. The normal ear drum illustration is one of the best available representations of this subject. Reproductions of the complete series have been requested by organizations and individuals outside NIH.

Sociological situation drawings for use in testing college and high school students in India and to prove the validity of the test were prepared. This series corresponds to an earlier group of situational drawings prepared by medical artists at NIH.

Two 3-dimensional plastic models showing the outlines of the arteries, veins, capillaries, granulation tissue, and subcutaneous tissue were prepared to demonstrate the theory that subcutaneous rheumatoid nodules develop in areas with arterial lesions.

Consultation on Fine and Applied Arts. Through Miss Inez M. Demonet, the Branch provides a unique consultation service to the Institutes on interior design and on numerous other aesthetic problems. For example, Miss Demonet has provided leadership on the general use of signs throughout NIH grounds and buildings and has designed main and secondary gateways for the reservation. In 1961, she served as color and design consultant on office furnishings for Building 31, and provided a similar service for redecorating at Saint Elizabeths Hospital. She is a member of the recently appointed committee to develop color standards for general interior painting of NIH buildings.

DRS, Medical Arts and Photography Branch, cont'd:

Motion Picture Services. A trend toward long-term motion picture projects has been noted by the Photography Section, which has been producing film footage for many years. Examples of these in 1961 included studies in patient rehabilitation, records of pre-operative and post-operative conditions of the patient, motion picture analyses of the functioning of prosthetic devices, and a variety of surgical studies.

More than 34,000 feet of motion picture film was photographed during the year, and almost half of this footage was in color. The 65 requests for cinematography received during the year represent a considerable increase over 1960. They ranged from 50 feet for a repeat of dot patterns on a continuous loop for studies of eye responses to more than 7,000 feet in recording the social behavior of rats. Experiments in depth stimuli of cortical areas of the brain were photographed as part of a long, continuing project initiated in 1959.

A series of glaucoma detection film sequences will be incorporated in a motion picture to be widely distributed by the World Health Organization.

Motion picture footage, along with simultaneous sound recordings, is an ideal indicator of patient progress. For example, close-range cinematic records were made of the oral and pharyngeal areas of patients with speech defects due to radical surgical excisions of tissue and bone. These close-up studies necessitated the designing of mirror and lighting equipment to provide shadowless light that would move integrally with the camera.

A series of short animated sequences was prepared for inclusion in a film illustrating nerve tract routes in the brain stem. Animation as a means of visual presentation in motion pictures is new to NIH, but the method has great potential in scientific communication.

Still Photography Services. The marked upward trend in incoming requests for photography cannot very well emphasize the range of services performed nor reflect their increasing complexity or the precision and accuracy required.

Today's research investigator needs slides, photomicrographs, photographic composites, and a multiplicity of photographic records in color and black and white. He relies on the photographic technician to provide him with duplicates of artist's renderings, anatomical atlas illustrations, photographs of patients for medical records and clinical conferences, copies of oscilloscope recordings, blow-ups of electrophoresis and electronmicroscopy plates, photographs of starch gel dispersals, and duplicates of X-rays, angiograms, chromatograms, electrocardiograms, and encephalograms--to mention but a few of the typical assignments for still photography. Much of the printing and processing that brings the photographic assignment to completion is done in conjunction with and in direct contact with the researcher.

The Photographic Section in 1959 undertook to alter techniques in the production of routine slides for NIH investigators and to standardize the 35mm. cardboard-bound slide for use in lectures abroad and for seminars and general presentation. The transition from the larger 3-1/4 x 4 inch size has been

DRS, Medical Arts and Photography Branch, cont'd:

facilitated by a three-unit arrangement for producing 35mm. slides. Since 1959, the production of the smaller slide, with its ease of portability and greater storage advantages, has increased greatly. In 1961, as a result of improved slide production, requests for the 35mm. service had increased 300 percent over 1960.

Small, roll-film, reflex cameras with interchangeable lenses have been used to advantage in photographic coverage where a minimum of equipment is desirable. First tried out for general photographic coverage in 1959, this lightweight equipment has been adapted to the photographing of surgical procedures, to serial brain section photography, to progressive studies of pathological conditions of the eye, and a variety of other procedures. Cameramen also made successful use of this equipment during 1961 in photographic field trips for the Institutes to several hospitals and laboratories throughout the country.

A new method and special photographic equipment has been developed for the visual recording of precipitations of antigens and antibodies contained within coilloidal gels. The same equipment, which makes use of refracted light rays and reflecting mirrors to detect reactions not discernible to the eye, has also achieved flexibility in photographing similar experiments employing starch gels, coilloidal solutions, and multiple gel masses of varying densities.

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH

DIVISION OF RESEARCH SERVICES

Summary of Branch Activities

1. DRS - 4
Serial Number

2. LABORATORY AIDS BRANCH

3. Dr. Preston Holden
Branch Chief

Objectives

The Laboratory Aids Branch was established in 1948 as a central service organization with assigned responsibilities for providing the NIH Laboratories with suitable research animals and bacteriological media and for processing laboratory glassware and animal cages. It has since continued these services at a steadily increasing rate, and, when funds were available, has made program changes to accommodate the constantly shifting needs of NIH investigators. Prior to 1960, the major program changes had included (1) expansion of facilities to house over 60 distinct breeding colonies of small laboratory animals, (2) development of major facilities for quarantining and conditioning large populations of monkeys, dogs, cats and farm animals, (3) addition of a comparative pathology staff to safeguard the health status of the animal colonies, (4) development of a program for the production of large quantities of tissue culture media and (5) establishment of a scientific instrumentation service which achieved independent Branch status in 1959 (Instrument Engineering and Development Branch, DRS.)

SUMMARY STATEMENT

Many of the more important LAB activities in 1961 were related to long range planning and development. Working with Research Facilities Planning Branch, Plant Engineering Branch, Environmental Services Branch and consulting architects, the Branch made considerable progress toward planning the permanent facilities to be constructed at the new Animal Center. Design was completed on conversion of office space in T-18 and T-19 to provide quarters for germfree, specific pathogen free and conventional animal breeding colonies. Also designed were 12 rooms with appropriate caging facilities for holding small shipments of monkeys in isolation in Wing-D, Building 14. This space will be made available by enclosing the outdoor monkey runs on the East side of the wing. Designed and constructed at the NIH Animal Center was a temporary dog kennel with 100 indoor-outdoor runs.

Evaluation was made of several changes in techniques and equipment used for managing animal colonies. The methods used for holding reserve rabbit breeders, coupled with appropriate testing, have maintained the colony free of coccidiosis for approximately 15 months. A radical change in management of several mouse colonies has resulted in marked decreases in mortality from infant diarrhea, the major cause of death among mice during the winter months. A system utilizing wire turkey cages was shown to be satisfactory for holding monkeys for conditioning. Adoption of this system at the NIH Animal Center will obviate the need for cage washing facilities during the early stages of development.

Major program developments during the year include: (1) All of the activities previously conducted at the Rockville Farm, plus a major share of the dog quarantine and holding services, were transferred to temporary facilities at the NIH Animal Center. (2) Key personnel capable of managing the production of germfree and SPF animals were recruited and trained. (3) Foundation breeding colonies of germfree rats and mice and SPF mice were established in germfree isolators. (4) Badly needed capability in microbiology was obtained through the recruitment of a well-trained veterinary microbiologist and an experienced laboratory assistant. (5) A clinical pathology

DRS, Laboratory Aids Branch, cont'd:

service was established to assist in diagnosing diseases in the animal colonies. (6) Refinements were made in pre-testing tissue culture media for sterility, and a start was made in producing tissue culture cells. These two developments have permitted increased quality control in tissue culture media production with a resultant improvement in the issued product. (7) The system of skin grafting developed in 1960 was adopted for general use to assure genetic integrity in the inbred mouse colonies.

Accomplishments

In the past decade, perceptive scientists have become increasingly aware of the need for specifically defined experimental animals in terms of their nutritional status, genetic background, and the microorganisms which they harbor. To meet this need, over 60 highly inbred strains and types of animals have been developed. These animals are "genetically defined" and permit reproducible responses from one generation to the next. Future research, however, requires that, in addition to being "genetically defined," some animals must be produced in an environment which is free of all detectable microorganisms. Similarly, there is a demand for animals which are known to be free of all agents which cause latent or overt disease. Considerable progress has been made during the past year in planning facilities for the production of such animals, in training of personnel who can perform the complex technical procedures required, and in establishing foundation breeding colonies with the desired characteristics.

Other program developments in animal production were related to improving methods of managing "conventional" breeding colonies. A diarrhetic condition which, as recently as a year ago, resulted in a high mortality rate in suckling mice, has been brought under control in several colonies. In these colonies, a system was adopted whereby breeding pairs were set up as permanent family units always held together in a single cage. The previously used system had employed a 1:5 breeding ratio and required the constant rotation of each female between a maternity cage and the cage containing the male. This system, which had been used at NIH for many years, was believed to have facilitated spread of the causal virus. Frequent cleaning and sterilizing of cages and handling of mice with forceps constitute other changes believed to have been important in reducing losses due to this disease. The new system has resulted in a 20% increase in the number of mice weaned per mouse breeding room. Coccidiosis control has been achieved by a change in management of the rabbit colony whereby reserve rabbit breeders are maintained in the rooms in which they are produced and are thoroughly tested before being dispersed to other breeding units.

A number of studies were initiated which were designed to improve the nutritional status of the breeding colonies or to

develop lines needed in specific research projects. Early sexual maturity, accompanied by a decrease in productivity, was noted in several inbred strains to which a high-fat diet was experimentally fed. Resumption of their previous diet (with kale, bread, and milk added) was found to greatly improve fecundity.

In cooperation with NIAID, the Branch established a colony of New Zealand Whites which are homozygous for one type of gamma globulin. A second colony, homozygous for another type of gamma globulin, is under development.

A breeding program to establish an inbred line of rats, characterized by hereditarily manifested cataracts of the eye, was requested by NINDB. The program, under the guidance of the Branch geneticist, is underway. A second breeding program, also requested by NINDB, will provide rats showing hereditary retinitis pigmentosa.

The skin-graft technique for determining genetic homogeneity, introduced experimentally in 1960, has been adopted as a routine measure. One female from every first litter produced by a breeder in the Expansion Colony serves as a donor of skin to be transplanted onto a Foundation Colony ex-breeder female of the same strain. Any errors in the mating system or mutations at the histocompatability loci may be detected using this technique.

The Animal Hospital provides large laboratory animals for NIH researchers through procurement from vendors, animals produced and raised within the Section, or through arrangements with animal pounds. Most of the large laboratory animals on long term experiments are held in facilities maintained by the Animal Hospital, which also provides clinical veterinary services for NIH investigators.

The supply of animals improved somewhat in the latter half of 1961. New sources and better contract negotiations have permitted substantial savings in the cost of procurement of rhesus monkeys. Quality-wise, there has been no change from last year and the greater number and variety of animals to be processed has resulted in increased demands for clinical veterinary service. Recent technical and pharmacological advances have made this service more effective. The use of formal lecture-demonstrations to provide advanced technical training to animal caretakers in the area has been of great advantage in meeting this increased workload.

The greatest single problem to be faced in the Animal Hospital revolves around the limited time for which animals may be held prior to issue. It is almost impossible to transform a sickly, undernourished, parasite-ridden dog or cat into a healthy laboratory tool in two weeks. It is equally difficult to properly condition monkeys suffering from pneumonia, dysentery or parasitic diseases within a comparably short time.

Recognition of this problem led to the construction of additional temporary quarantine facilities at the Animal Center and approval to enclose outdoor runs in Building 14-D. The space thus provided will permit more animals to be held and, concurrently, will permit extension of the quarantine-conditioning phase.

Considerable renovating was required to make the NIH Animal Center usable. For example, it was necessary to raze a structurally unsafe barn and residence, renovate a horse barn, bleeding room and laboratory, construct a temporary quarantine building, install a two-way radio, and fence three pastures. As a result of these improvements, it became possible to vacate the small leased farm near Rockville at mid-year.

A number of cooperative studies were performed during the year. Naval Medical Center scientists carried out a study on acquired resistance of monkeys to Shigella flexneri. Dogs and cats with disease conditions of special interest to NIH scientists are accepted on a referral basis from veterinarians in the area. Referrals usually involve locating an interested investigator, pickup and delivery of animals, and follow up reports to the referring veterinarian.

Special needs were also met. Twenty-three calls were made to various laboratories to test, diagnose and treat monkeys. One investigator was provided with blood from a new-born calf which had not nursed. The investigator could not use blood from a calf which had obtained colostrum milk.

Special handling and disposal techniques were developed when it was necessary to inject a number of sheep and dogs with radioisotopes; and special organ, tumor and blood banks were established and enlarged at the request of NIH scientists. Surgical, obstetrical and post-operative procedures were performed in accordance with specific needs of investigators.

DRS, Laboratory Aids Branch, cont'd:

During the past year, the program of the Comparative Pathology Section was altered to provide more efficient means of surveying the health status of laboratory animals produced and quarantined in the NIH animal colonies. A microbiologist has been added to the staff and provided with technical assistance and equipment. Training in clinical chemistry, technical assistance and equipment necessary for operation of a small scale clinical pathology laboratory is being provided for a staff pathologist.

While these program changes have not altered the basic objectives of the Section, namely, to provide diagnostic and disease control service, they have accentuated the activity of the Section in research of diseases of laboratory animals. Under the present program alignment, diagnostic pathology examinations are generally limited to identification of disease conditions affecting production. Microbiological testing procedures have been increased to provide more thorough characterization of diseases caused or influenced by microorganisms. Clinical pathology testing procedures have been employed more extensively to better characterize both infections and metabolic diseases of laboratory animals.

These changes were responsible for successful characterization of an enterotoxemia in our rabbit colony (not previously recognized in this species), the presence of urolithiasis (bladder stones) in certain strains of mice, and a highly accurate technique for its detection, and the discovery of a rare disease (Tyzzer's) in a small number of mice. Studies to determine more fully the etiology of this disease were initiated.

A space saving measure, the closed module or "Horsfall" type caging technique, received preliminary evaluation. If successful, this technique will permit controlled experimentation with one or more infectious agents in a single room of susceptible animals.

The Branch has assumed increased responsibilities in areas not related to laboratory animals. For example, water deionizers, serving some of the Clinical Center facilities in addition to those of the Branch, became the maintenance and operational responsibility of the Laboratory Glassware Preparation Unit. The Unit also assumed responsibility for operating a large combination gas-steam autoclave to sterilize bedding and other paraphernalia from patient rooms.

DRS, Laboratory Aids Branch, cont'd:

Other program-oriented changes which took place included: (a) creation of a permanent glassware sorting area to relieve congestion at the loading end of the glassware washer; (b) purchase and installation of two automatic pipette plugging machines which will eventually release two or three workers for other duties; (c) obtained additional allotment of funds for replacement glassware. Consequently, it has now become possible to include graduated cylinders to the stock of clean sterilized glassware available for laboratory use.

Although two Institutes now process most of their own glassware, workload for the current year is slightly greater than that accomplished in 1960, thus reflecting increased use by other Institutes.

Until a few years ago, little change had taken place in the production of bacteriological media. With the advent of new and refined tissue culture techniques, however, different methods and new products were required. Approximately one-third of the 50,000 liters produced during 1961 was tissue culture media.

Plans and cost estimates have been prepared for renovation of the Media Production area to provide space for tissue culture cell production and the installation of ultra violet light fixtures in the sterile work areas. However, serious consideration should be given to future space needs of the Unit. The critical nature of tissue culture media and the problems involved in large scale sterile production of such media make the need for more adequate sterile work areas of prime importance.

An example of the developmental work carried on by the Media Unit was a fluorescein amine medium developed by its Section Chief. Use of this medium permits large numbers of primary samples to be screened for virulent Staphylococci in a relatively short period of time. Identification of these organisms previously required their isolation and pure culture prior to cultivation on selective test media. Positive cultures were indicated by the fermentation of mannitol and production of the enzyme coagulase. When the new medium is used, mannitol fermentation, in the presence of fluorescein amine, is accompanied by fluorescence, which is easily detected under ultra violet light. Whereas the former method required 48-72 hours for positive identification of virulent

"Staph," the new method reveals potentially virulent "Staph" overnight (24 hours). Further sub-cultures of the Staphylococci are not affected, nor are other organisms in the samples inhibited by the medium.

Another worthwhile contribution was the development of a disc sensitivity test medium on which results may be read in 2 to 6 hours instead of the present 16 hours.

Program Plans

Animal programs will be improved to provide increased numbers, greater variety, and higher quality. Studies in genetics, in addition to programs mentioned earlier, will provide animal lines developed for specific research projects. The skin grafting technique will be adapted to other genetic problems.

Germfree and specific pathogen free production programs will be accelerated as rapidly as facilities become available. Full production is expected by calendar year 1963.

Increased surveillance over animal production, quarantine, and laboratory colonies will be maintained, and active measures will be taken to detect, control, and eradicate pathogenic conditions wherever possible.

Greater emphasis will be placed on the review of current concepts in regard to animal housing and husbandry. A major project will be started to develop and evaluate new techniques and systems for producing or holding experimental animals.

During the next five years, many of the Branch programs will be moved to the NIH Animal Center. It will be the Branch's responsibility to plan and execute the component moves with the least interruption possible to the services provided by the Branch. Furthermore, the occupation of Buildings 14 and 28 by other program activities must be regulated so as to proceed in an orderly manner and with the least hazard to the health status of the remaining LAB animal colonies.

Within the next 10 years, it is probable that NIH scientists will correctly insist that virtually all small laboratory animals

DRS, Laboratory Aids Branch, cont'd:

be produced under germfree or SPF conditions. Furthermore, it is inconceivable that they will long continue to accept stray monkeys, dogs, and cats as reliable test animals. Therefore, the Branch anticipates continued expansion of SPF and germfree animal production in small animals and the assumption of responsibility for breeding a major proportion of the cats and dogs used in NIH research.

DRS, Laboratory Aids Branch, cont'd:

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Kimler, Alexander. Fluorescein Amine Media for Rapid Differentiation of Staphylococci. Journal of Bacteriology, 82: 106-109, 1961.

Serial No. 4.1
1. Laboratory Aids Branch
2. Animal Hospital Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: PROSTHETIC REPLACEMENT OF THE FEMORAL HEAD

Principal Investigator: William I. Gay, D.V.M.

Other Investigators: Sara Jane Uhrich, D.V.M.

Cooperating Units: Experimental Surgery Unit, A.H.S.

Man Years (calendar year 1961):
Total: .05
Professional: .05
Other: .0

Project Description:

Objective: To evaluate simple metallic devices for replacing diseased or injured femoral heads in the dog.

Major Findings: Although no clinical work has been done with the device designed by Dr. Gay for several years, specimens have been collected from this project. Radiographs have been made of these specimens and of existing dogs. A survey of this work was included in a report to the American Animal Hospital Association and appeared in the journal "Small Animal Clinician." A more extensive report will be written at a later date dealing with basic considerations in using this device.

Proposed Course of Project: Postponed until more suitable materials are available.

Part B included Yes X No

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B Honors, Awards and Publications

Publications:

Gay, William I. Evaluation of Hip Prostheses Used in Canine Patients. Small Animal Clinician, 1: 294-298, 1961.

Honors and Awards related to this project:

None

Serial No. 4.2
1. Laboratory Aids Branch
2. Animal Hospital Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: TESTING OF CASTIPLAST 11, 17 and 327 (RESINS OF THE EPOXY TYPE) IN TISSUE

Principal Investigator: Sara Jane Uhrich, D.V.M.

Other Investigators: William I. Gay, D.V.M.

Cooperating Units: Animal Surgery Unit, A.H.S.

Man Years (calendar year 1961):
Total: .10
Professional: .05
Other: .05

Project Description:

Objective: To determine tolerance of living tissue to these materials.

Methods Employed: Pieces of Castiplast 11, 17 and 327 were implanted into animals (rats and dogs) to determine tissue tolerance. Mr. John F. DeBroske, of the Instrument Engineering and Development Branch, DRS, proposes use of these materials in the manufacture of parts of the heart-lung pump and for the fabrication of prosthetic devices for bone replacement.

Major Findings: The Castiplast on histopathological examination was observed to have an inappreciable amount of tissue reaction.

Part A (Cont'd)

Proposed Course of Project: The producer, National Engineering Products, Incorporated, is no longer in business; therefore, the Castiplast is no longer available commercially. It is expected that the Instrument Engineering and Development Branch will attempt to develop a similar plastic so that it may then be evaluated for bone and other prosthetic devices.

Part B included Yes_____ No__X__

Serial No. 4.3
1. Laboratory Aids Branch
2. Animal Hospital Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: STUDY OF BOVINE OCULAR SQUAMOUS CARCINOMA

Principal Investigator: Dr. Francis Abinanti, NIAID

Other Investigators: William I. Gay, D.V.M.
Dr. Mearl Stanton, NCI

Cooperating Units: Animal Surgery Unit, A.H.S.

Man Years (calendar year 1961):
Total: .10
Professional: .05
Other: .05

Project Description:

Objective: To determine if cancer in the eye of cattle is of virus etiology.

To study the pathogenesis of the disease.

Methods Employed: Surgical removal of diseased tissues. Examination of tissues for viral agents.

Proposed Course of Project: Dr. Mearl Stanton has entered military service. Dr. Abinanti has found no evidence of virus etiology for this disease. Dr. Gay plans to follow those cases from which tumors of the lids and tumors originating on the

Part A (Cont'd)

conjunctiva were removed. If it appears that the surgical techniques used in these cases would be of value to veterinary practitioners, a report will be written.

Part B included Yes_____ No__X__

Serial No. 4.4

1. Laboratory Aids Branch
2. Animal Hospital Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: SURGICAL LENGTHENING OF LONG BONES IN THE DOG

Principal Investigator: William I. Gay, D.V.M.

Other Investigators: None

Cooperating Units: Animal Surgery Unit, A.H.S.

Man Years (calendar year 1961):

Total:	.01
Professional:	.01
Other:	.0

Project Description:

Major Findings: The materials used (anorganic bone and plastic) appear to be useless for the surgical lengthening of long bones in the dog.

Proposed Course of Project: This project is discontinued until more suitable grafting or replacement materials are available.

Part B included Yes_____ No X

Serial No. 4.5
1. Laboratory Aids Branch
2. Animal Hospital Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: AN ABDOMINAL WINDOW FOR VIEWING THE VISCERA OF A RABBIT

Principal Investigator: Sara Jane Uhrich, D.V.M.

Other Investigators: William I. Gay, D.V.M.
Dr. Jan Cammermeyer, NINDB

Cooperating Units: Animal Surgery Unit, A.H.S.

Man Years (calendar year 1961):
Total: .15
Professional: .10
Other: .05

Project Description:

Objective: The purpose of this project is to evaluate a lucite window for viewing the abdominal viscera of the rabbit.

Proposed Course of Project: This project no longer appears worthwhile for the Laboratory Aids Branch to continue. It is, therefore, discontinued until such time as it is again determined worthwhile.

Part B included Yes____ No X

Serial No. 4.6
1. Laboratory Aids Branch
2. Animal Hospital Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: RUMEN FISTULA PLUGS FOR GOATS

Principal Investigator: Sara Jane Uhrich, D.V.M.

Other Investigators: None

Cooperating Units: Animal Surgery Unit, A.H.S.

Man Years (calendar year 1961):
Total: .20
Professional: .15
Other: .05

Project Description:

Objectives: To design a plug for rumen fistulas, in goats, which will remain in place for several months and allow repeated removal of the rumen contents. This has been possible in sheep and cattle in the past but not in goats.

Major Findings: The plastic assembled type rumen plug proved useful in experiments where repeated removal of rumen contents was necessary.

Proposed Course of Project: The project has been discontinued since there is no need for such a device by NIH investigators at this time.

Part B included Yes_____ No X

Serial No. 4.7
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: MITOSIS OF MAST CELLS OF THE RAT

Principal Investigator: Anton M. Allen, D.V.M., Ph.D.

Other Investigators: None

Cooperating Units: None

Man Years (calendar year 1961):
Total: .50
Professional: .25
Other: .25 (Meggers)

Project Description:

Objective: To improvise methods of coloring mast cells which permit observation of the detailed structure of the nucleus.

To determine the occurrence of mitosis of mast cells in rats of different age.

Methods Employed: New combinations of tissue coloring agents (Feulgen reaction with non-metachromatic basic dyes) were utilized to demonstrate mitotic figures in identifiable mast cells. Single wavelength Feulgen microphotometry and autoradiography were employed to demonstrate evidence of DNA synthesis in mast cells.

Part A (Cont'd)

Major Findings: The findings to date (submitted to the Journal of the National Cancer Institute) indicate that synthesis of deoxyribonucleic acid, mitosis, and binucleation occur with predictable frequency in mast cells of rats of different age. The occurrence of mitotically dividing mast cells varies in relation to the age and rate of growth of the rats. Binucleation results from failure or delay of cytokinesis of mast cells undergoing mitosis.

Significance: In the past, it has been generally believed that mast cells rarely, if ever, undergo mitosis.

Proposed Course of Project: Continuation.

Part B included Yes X No

Serial No. 4.7

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B Honors, Awards and Publications

Publications:

Allen, A. M. Mitosis in Mast Cells of a Rat. Anatomical Record, 139: 13-21, 1961.

Honors and Awards related to this project:

None

Serial No. 4.8
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: FOCAL NECROTIC HEPATITIS OF RABBITS

Principal Investigator: James R. Ganaway, D.V.M.

Other Investigators: Roy F. Kinard, D.V.M.
Anton M. Allen, D.V.M., Ph.D.

Cooperating Units: Animal Production Section

Man Years (calendar year 1961):
Total: .17
Professional: .14
Other: .03 (Despeaux)

Project Description:

Objective: To define the pathological characters of this condition as it occurs in rabbits.

To attempt isolation of the etiologic agent.

To perform transmission studies designed to reproduce the natural disease.

To recommend measures designed to prevent the infection in the colony.

Methods Employed: Routine methods were used which embrace the field of pathology and microbiology.

Part A (Cont'd)

Major Findings: Several typical cases have been studied. Pathologically the condition has been defined. On this basis, the lesion has been correlated with a somewhat analogous lesion found in livers of another animal species. Attempts to isolate the agent have not been successful to date.

Significance: Essential to our knowledge of the diseases of our laboratory animals. Due to correlation of lesion seen in two animal species, a ready source and tool is available for attempted isolations (especially since attempts by other workers have not been successful in isolation of the etiological agent).

Proposed Course of Project: Continuation.

Part B included Yes_____ No X

Serial No. 4.9
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: INVESTIGATION OF DIARRHEA OF RABBITS

Principal Investigator: James R. Ganaway, D.V.M.

Other Investigators: Roy Kinard, D.V.M.
Anton M. Allen, D.V.M., Ph.D.

Cooperating Units: Animal Production Section

Man Years (calendar year 1961):
Total: .40
Professional: .27
Other: .13 (Despeaux)

Project Description:

Objective: To define the clinical and pathological characters of an epizootic of diarrhea which occurred in the rabbit colony.

Establish means of rapid diagnosis and attempt isolation of etiologic agent(s).

Perform transmission studies designed to reproduce the natural disease and, based on the foregoing, recommend measures for the prevention and/or control of the disease in the colony.

Methods Employed: Routine methods were used which embrace the fields of pathology, microbiology and immunology.

Part A (Cont'd)

Major Findings: Autopsy of 30 rabbits reveals the underlying cause of death to be a toxemia. Work in progress is designed to show that clostridial enterotoxemia was the cause of the epizootic.

Significance: Of vital interest is the first hand knowledge of the diseases of our laboratory animals in order that higher quality animals will be produced at the lowest cost per unit.

Of biomedical interest is the information to be gleaned from this study which may lead to a better understanding of related conditions in man (especially necrotic colitis and other lower bowel dysfunctions) and other animals (especially the analogous condition in sheep known as enterotoxemia).

Of academic interest is the fact that this condition has not been reported heretofore in rabbits.

Proposed Course of Project: Continuation.

Part B included Yes_____ No__X__

Serial No. 4.10
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: TYZZER'S DISEASE OF MICE

Principal Investigator: James R. Ganaway, D.V.M.

Other Investigators: None

Cooperating Units: Animal Production Section

Man Years (calendar year 1961):
Total: .07
Professional: .04
Other: .03

Project Description:

Objective: To isolate the etiological agent of Tyzzer's disease in mice, to reproduce the disease experimentally and recommend preventive or therapeutic measures for the control and/or elimination of the disease in the colony.

Methods Employed: Routine pathological and microbiological methods.

Major Findings: A survey indicates this disease is smoldering endemically in the general production mouse colony. Isolation of an etiologic agent from these mice has not been successful to date.

Part A (Cont'd)

Significance: Reports in the literature indicate that this disease of mice may reach epidemic proportions under certain conditions, to the extent that the entire colony is lost. The etiologic agent has not been successfully cultured and characterized. This isolation therefore becomes important.

Proposed Course of Project: Continuation.

Part B included Yes_____ No__X__

Serial No. 4.11
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: CHRONIC RESPIRATORY DISEASE OF THE ALBINO RAT

Principal Investigator: James R. Ganaway, D.V.M.

Other Investigators: None

Cooperating Units: None

Man Years (calendar year 1961):
Total: .14
Professional: .08
Other: .06

Project Description:

Objective: This project has been a major endeavor of the principal investigator for the past three years at another institution (Armed Forces Institute of Pathology). Work has progressed to a point where transmission studies are in progress. The pathogenesis of three unrelated agents separately and in combination are being pursued. Eventually, recommendations will be made on the prevention and control of this disease complex under colony conditions.

Methods Employed: Routine methods employing pathology, microbiology and immunology were used.

Part A (Cont'd)

Major Findings: The singular role of pleuropneumonia-like organisms (PPLO) in this disease complex has been explored in rats free of this disease complex. Findings were negative and are in agreement with those of some workers.

Significance: This disease complex is the cause of greatest morbidity and eventual mortality of the albino rat. Affected rats are unfit for research, particularly where destined for long term or toxicity studies.

Proposed Course of Project: Continuation.

Part B included Yes_____ No__X__

Serial No. 4.12
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: A SURVEY OF MYCOTIC DISEASES IN DOMESTIC ANIMALS SUBMITTED BY THE COMMUNICABLE DISEASE CENTER, KANSAS CITY, KANSAS

Principal Investigators: Robert T. Habermann, D.V.M.
Robert W. Menges, D.V.M., CDC

Other Investigators: None

Cooperating Units: Communicable Disease Center

Man Years (calendar year 1961):
Total: .30
Professional: .15
Other: .15 (Lewis, Faulkner's tissue processing unit)

Project Description:

Objective: To determine the occurrence of blastomycosis, histoplasmosis and other mycotic infections, and to correlate histological and serological findings.

Methods Employed: Ordinary histopathological and serological methods including the flotation antibody techniques.

Part A (Cont'd)

Major Findings: Tissue from 144 animals was received for examination. The listing below shows the species, quantity and differential diagnoses made.

Dogs - 75
- Blastomycosis-15
- Histoplasmosis-6
- Neoplasms-8
- Pneumonia-18
- Nocardiasis-2
- Dirofilariasis-2
- Splenitis-1
- Bronchitis-2
- Pyoderma-7

Cats - 11
- Pneumonia-2
- Bronchitis-2
- Parasitism-1
- Meningitis-1
- Peritonitis-1

Sheep - 13
- Hepatitis-1
- Peritonitis-1
- Neoplasms-1
- Sarcosporidiosis-1
- Enterotoxemia-1

Otter - 1
- Peritonitis-1

Cattle - 8
- Hepatitis-1
- Pleurisy-1
- Nephritis-1
- Pneumonia-1
- Verminous pneumonia-1

Hogs - 13
- Pneumonia-7
- Verminous pneumonia-2
- Blastomycosis-1

Horses - 14
- Strongyloidosis-2
- Splenitis-1
- Histoplasmosis-1

Kangaroo - 1
- Pneumonia-1

Gorilla - 2
- Measles-1
- Filariasis-1

Chickens - 6
- Lymphomatosis-1
- Tuberculosis-1

Significance: The findings reveal a high prevalence of blastomycosis and histoplasmosis of domestic animals in areas where these diseases frequently occur in man.

Proposed Course of Project: Continuation.

Part B included Yes_____ No X

Serial No. 4.13
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: A STUDY OF CHRONIC RESPIRATORY DISEASE IN RATS

Principal Investigators: Robert T. Habermann, D.V.M.
Rex R. Every, D.V.M.

Other Investigators: None

Cooperating Units: None

Man Years (calendar year 1961):
Total: .30
Professional: .15
Other: .15 (Lewis and Talley)

Project Description:

Objective: To determine the effect of sulfamerazine and broad spectrum antibiotics on the course of chronic respiratory diseases in successive generations of rats.

Methods Employed: Ordinary methods of bacteriology, pathology, and long term colony management.

Major Findings: Sulfamerazine controlled rhinitis, middle ear infection and bronchiectasis when offered continuously in the feed and markedly reduced these infections when offered daily in the drinking water.

Part A (Cont'd)

Significance: Chronic respiratory disease is a very important disease that infects about 100% of aged rats reared in the ordinary rat colony.

Proposed Course of Project: Continuation.

Part B included Yes_____ No__X__

Serial No. 4.14
1. Laboratory Aids Branch
2. Comparative Pathology Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: INVESTIGATION OF THE PROBLEM OF URINARY BLADDER STONES IN MICE

Principal Investigator: Roy Kinard, D.V.M.

Other Investigators: None

Cooperating Units: Animal Production Section
Animal Hospital Section

Man Years (calendar year 1961):
Total: .6
Professional: .3
Other: .3

Project Description:

Objective: To describe the disease, ascertain the etiology and prescribe an eradication program.

Methods Employed: Ordinary methods of urinalysis, qualitative chemical analysis, minerology, histopathology, radiology and statistics were employed.

Major Findings: A manuscript has been submitted to the Journal of Urology. The summary of that manuscript is as follows: "A disease characterized by (1) urinary bladder stones composed of magnesium ammonium phosphate hexahydrate (struvite), (2) alkaline urine, (3) small body size and excessive culling, (4) cystitis and pyelonephritis has been

Part A (Cont'd)

observed in mice, especially females of the BALB/cAnN inbred strain and the CAF_1 and CDF_1 hybrid types. Young mice with stones may be selected readily by means of urine pH determination and radiographic examination."

Significance:	It appears that the eradication of this ailment, or its cause, would reduce appreciably the number of mice rejected for laboratory use.
Proposed Course of Project:	Continuation.

Part B included Yes_____ No__X__

Serial No. 4.15

1. Laboratory Aids Branch
2. Media & Glassware Preparation Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: FLUORESCEIN AMINE MEDIA FOR RAPID DIFFERENTIATION OF STAPHYLOCOCCI

Principal Investigator: Alexander Kimler, Ph.D.

Other Investigators: None

Cooperating Units: NIH Employee Health Unit

Man Years (calendar year 1961):

Total:	.25
Professional:	.25
Other:	.0

Project Description:

Objective: To develop a method by which potentially virulent staphylococci might be detected in primary culture.

Methods Employed: Five media normally used for the primary isolation of Staphylococci spp. were modified so that each contained sheep blood, mannitol, and fluorescein amine. Onto pour plates prepared from these media were streaked 216 stock cultures and 200 clinical specimens. Control studies were also carried out to determine coagulase activity, mannitol fermentation and fluorescence under ultraviolet irradiation on trypticase soy blood agar plates. After incubation for 24 hours, colonies were examined for fluorescence under ultraviolet irradiation of 3660A.

Part A (Cont'd)

Major Findings: In organisms that were coagulase positive, there was virtually complete agreement with positive mannitol fermentation and fluorescence. Mannitol fermenters always fluoresced. Trypticase soy agar containing fluorescein amine did not inhibit the growth of other pathogens.

Significance: By modifying conventional media to include blood, mannitol and fluorescein amine, potentially virulent staphylococci may be isolated and identified directly, thus decreasing the time lapse between the taking of clinical specimens and detection of pathogenic staph. While fluorescein amine blood agar does not substitute for the coagulase test, it offers distinct advantages over a number of other media in current use. These are: (1) provides primary isolation and identification; (2) does not change characteristics of colony morphology, pigment, or hemolysis; (3) does not inhibit other pathogens in clinical specimens.

Proposed Course of Project: Completed.

Part B included Yes X No

Serial No. 4.15

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B Honors, Awards, and Publications

Publications:

Kimler, Alexander. Fluorescein Amine Media for Rapid Differentiation of Staphylococci. Journal of Bacteriology, 82: 106-109, 1961.

Honors and Awards related to this project:

None

Serial No. 4.16
1. Laboratory Aids Branch
2. Media & Glassware Preparatic Section
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A

Project Title: A NEW PLATING MEDIUM FOR RAPID DISC SENSITIVITY TESTS

Principal Investigator: Alexander Kimler, Ph.D.

Other Investigators: None

Cooperating Units: None

Man Years (calendar year 1961):
Total: .10
Professional: .10
Other: .0

Project Description:

Objective: To develop a more rapid means of determining antibiotic sensitivity of bacterial pathogens.

Methods Employed: Tryptose agar with thiamine was modified by the addition of d-mannitol, Dubos Oleic Serum Mixture, and triphenyltetrazolium chloride. Pour plates were prepared and streaked heavily with 147 strains of eight common bacterial pathogens. Sensitivity discs were applied with a Baltimore Biological Laboratory dispenser. Four different antibiotics were used, each in two different concentrations. All plates were incubated immediately at 37°C., and read macroscopically at one-half hour intervals up to six hours.

Part A (Cont'd)

Major Findings: The antibiotic sensitivity of bacterial pathogens may be read in two to six hours by using a new medium incorporating a tetrazolium salt, on which isolates grew rapidly.

Significance: The importance of rapid sensitivity readings lies in the earlier application of specific chemotherapy. As generally practiced, the results of disc tests are reported in 16 to 24 hours. This new method reduces this time lapse to 2 to 6 hours, permitting earlier application of specific treatment.

Proposed Course of Project: Completed.

Part B included Yes X No

PHS-NIH
Individual Project Report
Calendar Year 1961

Part B Honors, Awards, and Publications

Publications:

Kimler, Alexander. A New Plating Medium for Rapid Disc Sensitivity Tests. Military Medicine, 127: 371-372, 1961.

Honors and Awards related to this project:

None

December 1961 Calendar Year 1961

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH

DIVISION OF RESEARCH SERVICES

Summary of Branch Activities

1. DRS 5
Serial Number

2. Computation and Data Processing Branch
Branch

3. Dr. Norman Z. Shapiro
Branch Chief

Objectives

The objectives of the Computation and Data Processing Branch are:

To provide expert mathematical and statistical consulting in the design, execution, and analysis of experiments and studies.

To plan and conduct research in the application of mathematics, statistics, and data processing methods to biomedical investigations.

To provide a central data processing service consisting of electronic computing and electric accounting machinery.

Programs

The program of this Branch is to carry on the above objectives. Its activities continue from year to year and are financed through the NIH Service and Supply Fund and through a fund contributed by the Institutes and Divisions to support the installation and initial operation of the Honeywell-800 System. The activities of the Branch are not readily classifiable by programs with a definite beginning and end. However, there is in a general sense a logical group of activities associated with each of the three objectives. The third, that of providing NIH with a central data processing service, consumed most of the efforts of the Branch during the year. The second largest group of the Branch's activities related to the first of the objectives, in the form of technical consultation to the rest of NIH. Staffing and equipment difficulties, and the pressure of the daily work load, have minimized the amount of effort which was given to the research objective.

Accomplishments

The major accomplishment during 1961 was staff training and development in anticipation of the change in computers from the IBM 650 to the Honeywell-800. In addition, the Branch was able to continue its normal workload with a gradual increase in volume.

The Honeywell-800 Computer was installed in September 1961, and was accepted in November. The Branch was able to arrange the physical relocation of the 650 equipment within the data processing center, and with the assistance of minimum outside machine rental time, to continue a normal workload on an uninterrupted basis.

Another significant achievement during the year has been the change in the composition of the staff, reflecting requirements of the computer and the increasing importance of research applications as a major part of the workload.

The Branch engaged in a great deal of consultation with research investigators, biometricians, and administrative personnel in the various Institutes and Divisions, as well as with representatives of other Federal, state, and private organizations.

Typical of the more important computer projects during 1961 were:

Processing a semi-weekly payroll for all employees.

Processing all financial accounting and budget records.

Processing supply and property records.

Computing values for a function for a range of values of two parameters.

Computing correlation problems containing simple, partial and multiple correlations.

Computing multiple correlation problems containing up to fifty variables.

Computing multiple regressions with four variables.

Steps to Improve Service

Although 1961 was a year of changes and plans for changes, emphasis was given to improvement of service. The Branch is seeking to achieve a data processing center that is versatile in its ability to perform, easily accessible, responsive to customer needs and widely used. Several steps were taken during the year in the interest of achieving this objective. Internal reorganization of the Branch was effected to provide faster, more personal service to customers; a scanner-plotter system was installed; electric accounting machines were modernized; and a Deputy Chief was appointed to give attention to the broad management responsibilities of the Branch, thus freeing the Branch Chief for additional and deeper participation in NIH's research programs. An important element in service improvement is in the program designed to acquaint scientists and other customers with the programming systems for the Honeywell-800 so that many of the data processing problems can be programmed readily by the customer. While only a start was made on this program, greater emphasis will be given to it during 1962.

Consultation

The Branch serves as the NIH focal point for leadership in the use of computers in medical research. In this role, it advises scientists, administrators, and others, concerning the potential of computers for various types of research and administrative applications, assisting them to plan procedures to be followed in developing applications.

During 1961, the Branch worked with the Instrument Engineering and Development Branch and with an ad hoc committee of scientists to select a consultant to develop recommendations for the conversion of laboratory equipment output for seven types of equipment to a form acceptable to the computer.

The Branch also consults with the Office of the Director, various Institutes and other Public Health Service organizational units concerning data processing equipment needs.

In addition, technical programming consultation is provided to individual scientists who elect to do their own programming. This consultation is separate and apart from the fee-for-service programming which is a continuing service.

Training and Staff Development

The most important single requisite for the successful use of a large computer in a research environment is the availability of a competent staff. The disciplines required for programming scientific research applications and for operating a complex computer system are not easily available, and the Federal Government has not fully recognized the scarcity of personnel in the various disciplines involved. To solve the problem of recruiting and training an adequate staff to support computer operations, the Data Processing Branch has placed major emphasis upon training. A majority of the members of the technical staff have short experience in programming. In 1961 the task was faced of training this staff to use new programming systems required for utilization of the Honeywell-800, and at the same time to continue programming for current operations on the 650 and other computers. The training program has assumed a variety of forms. Major use has been made of in-service training by the senior staff, using the facilities at the Army Map Service for practice on the Minneapolis-Honeywell computer. Instructors from the Minneapolis-Honeywell Corporation have taught classes of Branch and other interested NIH personnel in the principles and problems of programming, and in the operation of the new computer. Major use has been made of programming courses outside of NIH sponsored by Minneapolis-Honeywell and IBM. In addition, the Branch staff has participated in numerous conferences designed to exchange technical information and to improve the ability of the staff to meet NIH computer service needs. These include conferences of the Honeywell-800 Users Group and meetings of the Biomedical Information-Processing Organization, the Interagency Committee on Automatic Data Processing, the NIH Computation and Data Processing Advisory Committee, the Public Health Service Data Processing Chiefs, and the Eastern Joint Computer Conference.

Equipment Use

During the year, utilization of the IBM 650 Computer was increased to an average of 2.4 shifts per month. Peak utilization, approximating full time use, occurred in August. In addition to the IBM 650, the Branch has been able to make arrangements with other government agencies and private industry to use their computers to run programs that would otherwise have been delayed. It has been able to acquire approximately five hundred hours of machine time on systems more proficient than the IBM 650.

The Honeywell-800 was accepted in November and has been used on some production work. At the end of Calendar Year 1961 the relationship between research and administrative production stood at 65% research and 35% administrative application. Computer utilization of the Honeywell-800 is expected to increase to the point where all processing will be done on the Honeywell-800 early in 1962 and the IBM 650 will be removed from operation. The Honeywell-800 will provide capacity for a much larger volume of computer applications, most of which is expected to be of a research nature.

The While-You-Wait Telephone Service has become very popular with customers who have small scale processing projects. Approximately eight-hundred requests for service were handled during the year.

The machine complement of the EAM Processing Unit was modified by replacing existing machines with newer more sophisticated models. The result has been an ability to process a greater work load with fewer machines.

Personnel

As indicated under the heading of training, the successful use of the computer in medical research depends in a large measure on the number and quality of personnel available to program for and operate the computer. NIH progress in this field will therefore be directly dependent upon the availability of well trained mathematicians to program research applications. Despite the fact that personnel of the proper caliber are in extremely short supply nationally, and that the competitive position of the Government is not favorable, NIH was able to recruit eleven mathematicians, three programmers, and two computer console operators during the year. Separations from the Branch during 1961 included four programmers, five project planners, nine EAM operators, two console operators, and two clerical employees. The Computation and Data Processing Advisory Committee has strongly urged that every effort be made to improve the program for recruiting and training all programmers as the key to more effective use of the computer to support the research program. Major emphasis will be given to the recruitment of programmers in 1962.

Major Problems

The major problem being faced by the Branch is that of securing and training an adequate staff. As has been the case for the past several years, the present labor market for technical and professional personnel is very competitive. Recruiting through Personnel Management Branch and the normal Civil Service channels has not supplied sufficient candidates to meet our needs. To supplement this source, we have engaged in a broad recruiting campaign and plan to expand this effort in the future. Training in programming and equipment operation is being carried on and is expected to increase the quantity and quality of service provided to the NIH research program. Another problem generated by the change-over to the Honeywell-800 is the inadequacy of present space. Additional space is being renovated which, when available, is expected to satisfy our needs for the remainder of the Calendar Year.

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Serial Number 5.1
1. Computation and Data Processing Branch
2. Mathematical Analysis
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: NONLINEAR LEAST SQUARES FITTING

Principal Investigator: Norman Shapiro, Chief, CDPB, DRS

Other Investigators: None

Cooperating Units: Biometrics Research Branch, National Heart Institute, NIH. Biometrics Branch, National Institute of Mental Health, NIH, and Laboratory of Physical Biology, National Institute of Arthritis and Metabolic Diseases, NIH.

Man Years: Cannot be estimated

Project Description:

Objectives:

The development of a digital computer technique for fitting functions with nonlinear parameters to empirical data.

Method Employed: Numerical Analysis

Part B. included Yes___ No X

Major Findings:

Sufficient methods suited to problems of biological origin have been obtained.

Significance to Biomedical Research:

This technique, when successfully developed, will be applicable to the statistical study of various physiological processes, such as work in drug kinetics, as well as to the analysis of the results of laboratory experiments such as spectroscopy.

Proposed Course of Project: Continue work

Serial Number 5.2
1. Computation and Data Processing Branch
2. Mathematical Analysis
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: THE USE OF MONTE CARLO TECHNIQUES IN THE SIMULATION OF BIOLOGICAL SYSTEMS

Principal Investigator: Norman Shapiro, Chief, CDPB, DRS
Herman Vreenegoor, Acting Chief, Analysis and Programming Section, CDPB, DRS

Cooperating Units: Computation and Data Processing Branch, DRS

Man Years: Cannot be estimated

Project Description:

Objectives:

To explore Monte Carlo Techniques of a kind hitherto used in military applications to mathematical models of physiological systems.

Method Employed:

Use of Monte Carlo Techniques which have previously generally applied in nuclear physics and military scientists to verification of models of biological systems.

Part B. included Yes____ No X

Major Findings:

These techniques are applicable to simulation of biological systems.

Significance to Biomedical Research:

Use of techniques in explanation of the consequence of proposed models of biological systems should enable biological scientists to explore alternative explanations of the behavior of biological explanations with greater ease and greater freedom.

Proposed Course of Project: Continue work

Serial Number 5.3
1. Computation and Data Processing Branch
2. Mathematical Analysis
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: THE KINETICS OF CHEMICAL REACTION OF MIGRATORY SYSTEMS

Principal Investigators: Norman Shapiro, Chief, CDPB, DRS
Dewitt Stetten, NIAMD

Cooperating Units: Computation and Data Processing Branch, DRS, and Office of Associate Director in Charge of Research, NIAMD

Man Years: Cannot be estimated

Project Description:

Objectives:

The formulation of a mathematical system which will allow the analysis of systems of chemical reactions which occur in conjunction with the migration of reacting species.

Method Employed:

Partial differential equations, digital computer techniques, and linear vector algebra.

Part B. included Yes____ No X

Major Findings:

By means of appropriate linear transformations, the partial differential equations covering these types of reaction systems may be simplified to a form which allows digital computer solution. This work has resulted in the presentation of two papers during this Calendar Year.

Significance to Biomedical Research:

The techniques developed here promise to supply laboratory research with more powerful methods for interpreting the results of experimentation for employing such techniques as electrophoresis, chromatography, and centrifugal techniques.

Proposed Course of Project: Continue work

Serial Number 5.4
1. Computation and Data Processing Branch
2. Mathematical Analysis
3. Bethesda

PHS-NIH
Individual Project Report
Calendar Year 1961

Part A.

Project Title: CALCULATION OF TRANSIENTS IN MUSCULAR CONTRACTION

Principal Investigator: Norman Shapiro, Chief, CDPB, DRS

Other Investigators: R. J. Podolsky, Naval Medical Center, and Herman Vreenegoor, Acting Chief, Analysis and Programming Section, CDPB

Cooperating Units: Computation and Data Processing Branch, DRS, NIH, and Naval Medical Research Institute, Bethesda, Maryland

Man Years: Cannot be estimated

Project Description:

Objectives:

Computer implementation of the mechanism of the muscular contraction under the various hypotheses.

Method Employed:

Conventional mathematics, Monte Carlo techniques and experimental programming techniques.

Part B. included Yes ___ No X

Major Findings:

Complex molecular level models of biological systems can successfully be employed by means of digital computer techniques, related to those used in atomic physics and military technology.

Significance to Biomedical Research:

The ability to employ models of biological systems by means of digital computers should prove to be powerful investigative tools in many biomedical areas.

Proposed Course of Project: Continue work

Calendar Year 1961

Summary of Branch Activities

1. DRS-6
Serial Number

2. ENVIRONMENTAL SERVICES BRANCH
Branch

3. Edwin M. Lamphere, Sr. San. Engr.
Acting Branch Chief

Objective

The objective of the Environmental Services Branch is to provide the direct operational services, consultations, and special studies that are required by the Institutes and Divisions of NIH to maintain a satisfactory environment and sanitary conditions at NIH and its field stations.

Program

Tne Environmental Services Branch program consists of two interrelated phases:

1. Environmental control from the standpoint of personnel hazards and efficiency.

2. Environmental control from the standpoint of the scientists' needs in specialized research activities.

Both phases are geared directly to the needs of the NIH Institutes and Divisions, with the bulk of the workload being formed by providing consultative services upon request.

With regard to environmental control from the personnel hazard and efficiency viewpoint, general sanitation is an important feature; and emphasis is placed on evaluation of food kitchens, snack bars, the laundry, infectious waste disposal, animal rooms, patient care areas, operating rooms, laboratories, and corridors.

Closely associated with the general sanitation program are the insect and rodent control activities, since poor sanitation results in insect and rodent infestation problems. In order to prevent undesirable infestation and possible cross-infection between animals, patients, and staff members, an active control program is pursued. This consists of regularly scheduled insecticidal application and maintenance of rodent traps and poison bait stations, together with evaluation of factors which encourage the presence and reproduction of insects and rodents. All insecticides are screened for gross hormonal activity. Continual efforts are made to acquire more effective insecticides and more efficient methods of applying them.

Still another field of emphasis in the Branch program is that of environmental engineering. Activities in this area include investigation and preparation of recommendations or full scale reports covering installation of ultraviolet lights, sound and vibration problems, safety and adequacy of water and waste disposal systems, air pollution problems of nuisance or safety significance, control of toxic or irritating fumes, and plans for alterations or new construction.

With regard to environmental control from the standpoint of supporting the Institutes in specialized research activities, one major field of emphasis relates to germfree, pathogen-free, and virus-defined work. This includes development of equipment, animal monitoring, sterilization of equipment, and functional planning of facilities.

Other activities include preparing feasibility reports for special research situations, providing the scientist with reports on the environment in which he is carrying out experiments, maintaining a limited stock of instrumentation for Institute use on a short-term basis, monitoring the distilled and deionized water systems, maintaining competence for trouble shooting on problems concerning disinfection, sterilization and cleaning, and furnishing routine laboratory work on environmental control problems or activities.

Summary of Progress

A reorganization of the Branch placed all sanitation and biological activities in one section and all engineering activities in another. This, together with a strengthening of the professional staff, brought about an over-all increase in the effectiveness of the Branch program.

With regard to general sanitation, routine programs, which include documented reports, were established for inspection of laboratories, animal rooms, patient areas, operating suites, barber and beauty shops, locker rooms, and the laundry. Progress was especially significant in animal rooms and food service areas.

In the area of insect and rodent control, a significant development was the rise in man-hour efficiency as it pertained to the routine building insecticiding program. The total length of time required to service all buildings on the reservation was decreased from 19 to 6 weeks. This improvement has resulted in a decline in insect population.

A laboratory project of particular interest is the development of a medium on which coagulase positive staphylococci can now be identified directly from swabs taken from patients, floors, or instruments. Progress is well advanced in other areas including isolation of organisms for use in pathogen-free animals and a method for evaluating the degree of cleanliness of floors.

In the field of environmental engineering there was a reduction in emphasis placed on routine services, such as maintenance of water deionizers and

inspection of animal cages, and an increase in emphasis on consultation services, both from the viewpoint of personnel health and efficiency and of environmental control for specialized research activities. With regard to health and personnel efficiency, progress was especially significant in the area of toxic or odorous fume control. Examples are evaluation of the Clinical Center short circuiting problem, with detailed recommendations for remedial action, development of a plastic fume hood for use with temporary specialized research activities, and evaluation with recommendations for solving fume hood, sterile room, and bacteriological safety room problems in the Dental Research Building.

Progress in environmental control as a support service for the research scientist has, to a considerable extent, taken the form of increased quantity and improved quality of consultative services on problems concerning such items as optimum electron microscope location, contamination of distilled water and cross-contamination of virus cultures.

Progress in control of the laboratory environment involving studies of a longer term nature included preparation of a feasibility report on construction of an anaerobic laboratory and development of virus-confining isolators for use with infected animals.

Accomplishments

As mentioned in the summary, the Branch was reorganized in 1961 to meet the changing needs of NIH. All sanitation and biological activities were consolidated and placed in one section and all engineering activities were placed in another. Routine service functions which previously required the facilities and resources of the Branch were turned over to other organizations, thus allowing more time for non-routine activities. Despite this reduction, the Branch carries a heavy service load, but is restricting its efforts to items which others are not prepared to handle.

For purposes of over-all coordination and assignment of priorities, Branch activities are divided into "services," "consultations," and "special studies."

Services

Specimens of water, milk, special formulae, and sandwiches from vending machines were examined on a routine basis. Vending unit kitchens and dairies supplying milk to NIH were inspected routinely.

Rodent traps and bait cups inside buildings and bait stations in problem areas throughout the reservation grounds and the farm were maintained. The problem of escaped hamsters was virtually eliminated after an investigation revealed that improperly secured cages were the source. No problem with wild rats has been encountered since a concentrated effort was made in this direction by installing outdoor bait boxes and by cleaning up construction sites.

Routine insecticidal treatment inside all buildings was carried out with a steady rise in man-hour efficiency. Careful analyses of problems, introduction of new insecticides, and use of the best available equipment has reduced the time required to cover all NIH buildings from 19 weeks to 6 weeks. As a result, the over-all insect population has been reduced.

The insect and rodent control activities were expanded during the year to include Buildings 14, 28, 30, and 31, and the P. J. Nee Warehouse. One additional man was added to the insect and rodent control staff.

Other routine services of the Branch reached into diverse areas of environmental control. Conductivity tests on centrally distilled water were made on a daily basis in the Clinical Center and at weekly intervals in all other NIH laboratory buildings. Copper determinations were made on a quarterly basis. Routine operation of water deionizers was discontinued, the responsibilities having been turned over to the Laboratory Aids Branch and the Plant Engineering Branch.

Sterilization of telephones was continued at the rate of approximately 50 per month, but negotiations are now under way to turn this responsibility over to the Laboratory Aids Branch. Routine maintenance of domestic water chlorination at the NIH farm has also been assumed by the Laboratory Aids Branch and the Plant Engineering Branch.

Another service for which responsibility has been transferred is that of conducting acceptance inspections for shipments of animal cages, racks, and related items. The Supply Management Branch now carries out this function.

Training lectures and demonstrations were provided for the Nursing Attendants' training courses on approximately a semi-monthly basis.

Laboratory and animal facilities were decontaminated with beta-propiolactone upon request from the Institutes.

Services in the field of germfree activities included sterilization of isolators and diet as required by the Institute programs.

Consultations

Consultations formed the great bulk of the workload throughout the year. Included in this category are the Branch sanitary inspection activities. During the year routine programs were established for inspection of laboratories, animal rooms, patient areas, operating suites, barber and beauty shops, locker rooms, and the laundry. Previously established programs were continued for food service areas. Formal inspection reports were submitted to the interested Institutes or Divisions recommending pertinent operational changes. Work requests were prepared for all necessary physical changes. Progress during the year was especially significant in animal rooms and food service areas. Much of the progress in animal room sanitation can be attributed to demonstration of correct sanitary procedures. With regard to food service facilities, the program was strengthened by permanently closing two units and temporarily closing another.

The demand for many specialized procedures relating to microbiological work not available elsewhere at NIH has increased steadily. Developments in this area included a special medium for direct detection and isolation of coagulase positive staphylococci and control techniques for pathogen-free animals.

The demand for consultation work relating to environmental engineering also increased steadily throughout the year. Representative of the activities engaged in were review of drawings for all major renovation and new construction, investigation of vibration conditions, recommendations for optimum location of an electron microscope, measurement of temperature, humidity, and air flow patterns for scientists engaged in animal studies, outlining functional requirements for boiler plant at the Cholera Research Laboratory, Dacca, development of plastic isolator in which to house virus-contaminated animals, investigation and recommendations for remedial action concerning toxic vapor control at various locations, and preparation of a guide covering environmental control considerations for NIH research facility design.

Special Studies

Special studies were carried out by the Branch as required to solve problems for which past experience or literature surveys provided no solution. The high consultation workload permitted time to be spent only on high priority work of this nature. Progress in this area included initiation of studies and preliminary development of equipment for measuring degree of floor cleanliness, investigation covering means of transfer of infectious organisms in clinical areas, investigation covering means by which Pseudomonas aeruginosa are spread through animal quarters, evaluation of ultraviolet light sterilization for specific critical locations, preparation of feasibility reports on the use of liquid nitrogen as a refrigerant at NIH and on the construction of a full scale anaerobic laboratory, completion of contract wind tunnel test and preparation of recommendations for alleviating the problem of short circuiting between Clinical Center fume hood exhausts and fresh air intakes, and development of a portable plastic fume hood for use in laboratory procedures of a temporary nature where control of vapors or odors is necessary.

Publications

1. Cooper, T., M.D., Ph.D., Morrow, A. G., M.D., Roberts, W. C., M.D., and Herman, L. G., Ph.D.: "Postoperative Endocarditis due to Candida: Clinical Observations and the Experimental Production of the Lesion." SURGERY, Vol. 50, No. 2, Pages 341-346, August, 1961.

2. Greene, V. W., and Herman, L. G., Ph.D.: "Problems Associated with Surface Sampling Techniques and Apparatus in the Institutional Environment." JOURNAL OF MILK AND FOOD TECHNOLOGY, Vol. 24, No. 8, Pages 262-265, August, 1961.

3. Herman, L. G., Ph.D.: "Antibiotic Sensitivity Testing Using Pretreated Agar Plates. III. In Vitro Inhibition of Proteus Species with a Combination of Sulfathiazole and Colistimethate Sodium." Paper presented at the Interscience Conference on Antimicrobial Agents and Chemotherapy, November 2, 1961, New York, and accepted for publication in ANTIBIOTICS ANNUAL 1961-1962.

4. Herman, L. G., Ph.D.: "Problems in Handling Contaminated Linens." Paper presented at the Institute on Hospital Laundry Management and Operation conducted by the American Hospital Association, Baltimore, Maryland, October 3, 1961.

5. Herman, L. G., Ph.D.: "The Role of the Housekeeping Department in the Control of Infectious Organisms." Paper presented at the Institute of Sanitation Management, Philadelphia, Pennsylvania, September 26, 1961.

6. Herman, L. G., Ph.D.: "Air Sampling Technics in a Hospital Environment." Paper presented at annual meeting of the American Society for Microbiology, Chicago, Illinois, April 25, 1961.

Major Problem

Lack of adequate space for efficient operation and coordination of program constituted the major problem. It is expected that this will be partially alleviated in the near future.

Program Objectives

General program objectives of the Branch are:

1. To maintain continuous surveillance of services and facilities relating to patient and employee environmental health.

2. To provide satisfactory solutions to environmental control problems in a sufficiently short period of time so that personnel are not unduly exposed to hazardous conditions or that research work is not unduly delayed.

3. By studies, surveys and training activities, to prevent environmental problems from occurring.

More specifically the objectives are:

1. To maintain the lowest practical level of insect and rodent populations through an effective sanitation program and an efficient insect and rodent control program. Emphasis on animal room, food service areas, and laboratory sanitation will be continued as will the search for safe but more potent insecticides and more efficient methods of applying them.

2. To increase surveillance of areas where potential hazards to personnel and experimental animals exist because of the presence of fungal and bacterial pathogenic organisms and to recommend appropriate measures for control where necessary.

3. To maintain a satisfactory degree of general sanitation through routine inspections and documented reports of all areas with special emphasis on food facilities, patient care areas, and animal production and test units.

4. To furnish increased microbiological support to the Laboratory Aids Branch, especially as it pertains to development of specific pathogen-free animal colonies.

5. To develop and establish training programs for food handlers, animal caretakers, housekeeping personnel, and laundry employees.

6. To continue routine surveillance of high quality water systems and cleaning and sterilizing equipment, with increased emphasis being placed on making provisions for procurement of better equipment at lower costs. Accomplishment of this will be realized through gradual development of performance-type specifications.

7. To develop equipment as required for the scientists for germfree, pathogen-free and virus-defined work, with increased emphasis on reduction of costs and on development of items for which there is an immediate foreseeable need.

8. To increase surveillance of areas where potential personnel hazards exist because of the presence of toxic fumes and to make immediate provisions for temporary relief and recommendations for long range relief.

9. To place additional emphasis on furnishing the professional biological and engineering support needed by the research scientist in providing for specially controlled environments. One special item to be undertaken is a study of the feasibility of constructing a trace element-free laboratory.

December 1961 Calendar Year 1961

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH

DIVISION OF RESEARCH SERVICES

Summary of Branch Activities

1. DRS-7
Serial Number

2. RESEARCH FACILITIES PLANNING BRANCH

3. A. E. Williamson
Branch Chief

Objectives

The objectives of this Branch include planning and construction of new facilities to meet the requirements of the expanding research program at NIH; the development and correlation of information covering the area of research facilities; and the promotion of technical education in this specific field.

Programs

Design and Construction

The personnel of this Branch serve as a focal point to correlate information required for design and construction of new research facilities. Liaison is maintained between the appropriate NIH Institute or Division, the Public Buildings Service (GSA), the Architect/Engineer, the contractor, and other agencies as required to see that the building program is carried on in the best interests of the NIH research program.

Development

A second program includes the correlation of existing data and the development of new information on design of research facilities so that it is readily available to NIH and other research agencies for future planning. Along with this an educational program is developing to meet the expanding planning needs in this specific building area.

Summary of Branch Progress

Developmental work in research facilities planning has been placed on a firm base during this, its first complete year, as a specific program. It has included the establishment of a library, sponsorship of one seminar, formulation of an interdisciplinary educational plan, and preparation of significant articles on various phases of design and planning. In addition, consultation services have been provided for many research agencies contemplating new construction.

Preparation of designs for the NINDB/NIMH Building, NIH Animal Center, New Surgical Wing reservation items and instrumentation, and Master Utilities Plan #2 are underway. The Master Plot Plan for the reservation was also revised. Programs of requirements for an extension to the General Office

Building and Gerontology Building (Baltimore) are being prepared. Construction has been completed on the Dental Research Laboratory and General Office Building. The construction contract for the New Surgical Wing is substantially complete. Other structures being built are a Cage Washing Building, National Library of Medicine, and the Air-Conditioning Plant extension.

Accomplishments

Intramural Visit Program. Visits to selected NIH laboratories were completed by Branch engineers, and a summary report compiled. A proposed design for future NIH laboratory buildings was prepared, based on information obtained.

Extramural Visit Program. Attendance by Branch personnel at the Research Grants Study Section meetings led to the designation of outstanding laboratories throughout the country which are representative of the application of the latest laboratory design concepts to medical research needs. Over 36 of these facilities have been visited and trip reports prepared. The information has been valuable for use in consultation services as well as for intramural planning and design.

Mock-up Area. Two full size mock-ups of laboratories have been constructed for the study of modular size, partition types, and ventilation and utility distribution systems, as well as other facets of laboratory design. As a result, a five foot module has been adopted as the new NIH standard.

Informational Material. Informational material, intended for distribution to any group engaged in laboratory planning, entitled Planning the Medical Research Facility, Selection of Laboratory Partitions, Laboratory Design at the National Institutes of Health, Conditioning the Air of Medical Research Buildings, and Animal Housing has been prepared and is either cleared for release or is in draft form.

Consultation Services. Consultation services have been rendered to approximately 100 organizations. This service has varied from the furnishing of prepared literature to the detailing of an engineer for a six-week assignment to the Ministry of Health of Bogota, Colombia. Technical assistance was also provided to the NHI Grants and Training Branch in connection with the planning of primate centers at Washington State University, the University of Oregon, the University of Wisconsin, and Tulane University, and in the site selection study for the primate conditioning center.

Education. A seminar for PHS engineers and architects was sponsored by the Branch for the purpose of exchanging experiences and problems in the area of research facility design. A second seminar is being planned which will include representation from industry and universities as well as the Government. An educational course for PHS engineers and architects has been developed in conjunction with the Georgetown University School of Medicine. The course was designed to give the engineer and architect a familiarity with the terminology, techniques and methods used in the various disciplines of medical research. Work is also under way to develop a summer course which will be made available to any engineer or architect engaged in research facility planning and design.

Library. The library of the RFPB has worked closely with the staff in support of individual projects. Fields of interest questionnaires, distributed at intervals, as well as interests brought out during biweekly staff meetings enabled the librarian to meet the specific needs of individual Branch staff members. The library has worked on such projects as primate centers, the NIH Animal Center, international conference building, radiation shielding, interdisciplinary education, human engineering, and has been active in obtaining specific publications, in providing information on design and construction of research facilities, on new methods and developments, and on costs and cost estimating. In addition to serving the RFPB, the library has begun to index technical reports for the Environmental Services Branch.

NIH Animal Center. The Master Site Plan and preliminary plans for Phase I of the Farm Development Program were completed. Phase I is scheduled for construction in late FY 1962 or early FY 1963, and consists of a kennel building, farm animal building, power plant and resident personnel dwellings. Preliminary consultation with administrative officials and scientific personnel required for the development of a program of requirements was completed for Phase IA. Phase IA consists of an animal behavior study facility and a primate holding facility and is scheduled for construction in FY 1963.

NCI-NIMH/NINDB Building Complex. Approvals of the program of requirements were obtained and an Architect/Engineer firm is developing preliminary plans.

Revision of the NIH Master Plot Plan. Revision of the Master Plot Plan for the NIH Bethesda reservation was completed, reviewed and approved.

Revision of the NIH Utilities Master Plot Plan and Report. A consulting engineer firm is revising the NIH Utilities Master Plan and Report in accordance with the revisions made and approved this year on the Master Plot Plan for the NIH reservation.

Extension to General Office Building Facilities. Consultation with administrative personnel required for development of the program of requirements was completed.

Gerontology Building, Baltimore City Hospitals. Consultation with administrative and scientific personnel required for development of the program of requirements was completed.

1963 Construction Budget Projects. Preliminary cost estimates and the development of a scope of project were made on the following new construction projects for inclusion in the FY 1963 construction budget: Addition to Biologics Standards Building, International Conference Building, Clinical Center Library Relocation, and Building 12 Extension and Addition.

New Surgical Wing.

1. Reservation Items. The preparation of plans and specifications covering reservation items (blood bank, observation dome, central hypothermia, etc.) are being prepared by the Architect/Engineer firm of York and Sawyer. These plans are 95% complete. The contract for the construction will be let early

during 1962 and will be completed within the calendar year.

2. Instrumentation. In cooperation with the Instrument Engineering and Development Branch and the Institutes involved, plans are being prepared for instrumentation of the neurology and cardiac operating suites. Correlation of the installation work will be handled directly by RFPB during the coming year.

New Construction. Tabulation of construction projects under way or completed during calendar year 1961 is attached.

NEW CONSTRUCTION, 1961

Building	Architect/ Engineer	Plans Completed	Contract Awarded	Contractor	Amount	Completion Date	Percent Complete
Surgical Wing (10-A)	York and Sawyer	2/4/59	6/25/59	Dean Construction Co.	$1,965,000	12/15/61 1/	100
Power Plant (11-C)	Nottingham Associates	9/9/60	11/28/60	W.G.Cornell Company	$1,125,000	4/1/62	61
Cage Washing (14-F-1)	PBS	4/1/61	7/4/61	Victor Beauchamp	$ 523,000	8/27/62	31
Dental Research Laboratory (30)	Ted Englehardt	10/22/58	3/25/59	Norair Engineering Corp.	$3,700,000	7/31/61	100
General Office Building (31)	Keyes, Lethbridge & Condon-Collins	5/11/59	9/4/59	Norair Engineering Corporation	$9,925,000	5/30/62 2/	99
National Library of Medicine (38)	O'Connor and Kilham	- - - -	6/2/59	A.Venneri Company	$7,300,000	6/1/62	91

1/ Completion date required by contract was 12/7/60, but the date estimated by PBS is 12/15/61. A supplemental construction contract will be required to complete the building for occupancy. Final completion estimated by RFPB is 1/30/62.

2/ Building completed for occupancy 10/24/61.

JANUARY 1962 CALENDAR YEAR 1961

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH

DIVISION OF RESEARCH SERVICES

SUMMARY OF BRANCH ACTIVITIES

1. DRS-8
SERIAL NUMBER

2. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
BRANCH

3. DR. FRED ALT
BRANCH CHIEF

OBJECTIVES

TO GIVE BIOMEDICAL ENGINEERING SUPPORT TO THE INTRAMURAL SCIENTISTS OF THE NATIONAL INSTITUTES OF HEALTH IN THE AREAS OF ENGINEERING METHODS, INSTRUMENTATION SYSTEMS, AND THE DESIGN, CONSTRUCTION, AND MAINTENANCE OF INSTRUMENTS, FOR APPLICATION TO CLINICAL AND LABORATORY BIOMEDICAL RESEARCH;

TO PROVIDE LEADERSHIP IN THE FIELD OF BIOMEDICAL INSTRUMENTATION--BOTH INSIDE AND OUTSIDE NIH--FOR SECURING THE WIDEST POSSIBLE DISSEMINATION AND USE OF INFORMATION ON THE LATEST DEVELOPMENTS, TO STIMULATE INVENTIVENESS, AND TO CREATE NATION-WIDE INTEREST IN THE FIELD.

PROGRAMS

IN ITS EFFORTS TOWARD THE FIRST OBJECTIVE (BIOMEDICAL INSTRUMENTATION SUPPORT OF THE INTRAMURAL RESEARCH PROGRAM), THE BRANCH IS AIMING AT TWO GOALS: CONTINUOUS RAISING OF THE QUALITY OF ITS PROFESSIONAL SERVICE, AND THE CONTINUED EFFICIENCY OF ITS OPERATION.

THE SERVICE RENDERED BY THE BRANCH FOLLOWS A DUAL PROGRAM: THE FIRST, AND HISTORICALLY THE OLDER PROGRAM, IS FABRICATION, REPAIR, AND MAINTENANCE OF INSTRUMENTS. OF MAJOR IMPORTANCE IS THE MANUFACTURE OF PROTOTYPE SPECIALTY INSTRUMENTS, COMMERCIALLY NOT AVAILABLE, NEEDED IN TODAY'S BIOMEDICAL RESEARCH.

THE SECOND PROGRAM OF THE BRANCH IS THE RENDERING OF BIOMEDICAL ENGINEERING SUPPORT TO THE NIH LIFE SCIENCE RESEARCHER. THE ENGINEERING SUPPORT PROGRAM PROVIDES THREE PATTERNS OF INSTRUMENTATION SERVICE: 1) THE CONSULTING OPERATION INVOLVING

FEASIBILITY STUDIES AND DEVELOPMENT AND DESIGN OF PROTOTYPE MODELS; 2) THE RESEARCH TEAM OPERATION, WHERE A BRANCH ENGINEER IS ASSIGNED TO A SPECIFIC LABORATORY AS A MEMBER OF ITS RESEARCH TEAM; AND 3) CONTRACT OPERATION, WHEREIN A BRANCH ENGINEER FORMULATES THE CONTRACT FOR THE SCIENTIST WITH AN OUTSIDE FIRM, DETERMINES TECHNICAL REQUIREMENTS AND SPECIFICATIONS, GUIDES AND EVALUATES PERFORMANCE, AND TESTS THE COMPLETED PRODUCT.

PROGRAMS RELATING TO THE OBJECTIVE OF PROVIDING LEADERSHIP IN THE SCIENCE OF BIOMEDICAL ENGINEERING FALL INTO THESE CATEGORIES: DISSEMINATION OF INFORMATION ON NEW DEVELOPMENTS IN THE FIELD THROUGH ARTICLES IN SCIENTIFIC JOURNALS, AND PRESENTATION OF LECTURES AND PAPERS AT PROFESSIONAL CONVENTIONS; RETRIEVAL OF INFORMATION THROUGH ADVANCED TRAINING AND EDUCATION OF BRANCH STAFF, THROUGH ATTENDING AND ORGANIZING BIOMEDICAL ENGINEERING SYMPOSIA, AND THROUGH VISITING OF BIOMEDICAL ENGINEERING FACILITIES OF OTHER RESEARCH ORGANIZATIONS, UNIVERSITIES, AND COMMERCIAL FIRMS; STIMULATION OF INTEREST AND CREATIVENESS IN BIOMEDICAL ENGINEERING BY ADDRESSING STUDENT MEETINGS, BY GUIDING TOURS TO NIH INSTRUMENTATION PROJECTS AND THROUGH THE BRANCH ENGINEERING OFFICES AND SHOPS, AND BY PARTICIPATING IN THE HIGH SCHOOL SCIENCE TEACHER SUMMER-WORK INSTITUTE PROGRAM OF THE NATIONAL SCIENCE FOUNDATION AND THE COSTEP PROGRAM.

THE FOLLOWING PARAGRAPHS WILL DEAL IN MORE DETAIL WITH THESE PROGRAMS.

SUMMARY OF IEDB PROGRESS AND ACCOMPLISHMENTS, 1961

1. MANY SIGNIFICANT CONTRIBUTIONS IN BIOMEDICAL INSTRUMENTATION TO THE NIH RESEARCH PROGRAM (COVERED IN TEXT AND PROJECT REPORTS);

2. ESTABLISHMENT OF A BREAKDOWN OF ENGINEERING PROJECTS INTO SPECIALIZED AREAS OF MEDICAL APPLICATION TO ACHIEVE THROUGH ENGINEERING KNOWLEDGE AND EXPERIENCE IN THE SPECIALTY FIELDS;

3. ASSIGNMENT OF ENGINEERS AS MEMBERS OF SCIENTIFIC TEAMS WHEN REQUESTED AND AS PERMITTED BY TOTAL WORKLOAD;

4. INCREASED USE OF CONTRACTS WITH OUTSIDE FIRMS AS A MEANS OF HANDLING PART OF THE HEAVY ENGINEERING WORKLOAD;

5. ACTIVATION OF TWO NEW AREA FABRICATION SHOPS FOR CLOSE SUPPORT OF RESEARCH LABORATORIES, ONE FOR NIDR AND ONE FOR THE CLINICAL NEUROPHARMACOLOGY RESEARCH CENTER, NIMH AT ST. ELIZABETHS HOSPITAL;

6. Intensification of programs in dissemination and retrieval of information concerning instrument engineering progress achieved both within and without NIH;

7. Increased advice and assistance to biomedical engineering researchers outside NIH to stimulate interest and activity in the field;

8. Increased activity in fostering biomedical engineering education, and student interest in the field.

Progress and Accomplishments

During 1961 significant progress was made in the following areas.

Specialization in the consulting engineering program

The ever-increasing scope of engineering assignments requested of IEDB made it necessary in 1961 to break down engineering activities into broad specialty fields to achieve the quality of service needed by the scientists. Engineering projects are now divided into three large areas of biomedical application: (1) biochemical analysis; (2) physiological monitoring and clinical application; and (3) automation and computer applications. These three operations are ably supported by engineering specialization such as electronic and mechanical. A new plastics facility is developing new synthetic materials and processes for prosthetic devices, artificial organs, and plastic electrodes. This breakdown into specialties enables IEDB to handle with more thorough knowledge and experience the wide variety of instrumentation projects demanded by medical research.

Team-Engineering program

An IEDB electronics engineer was assigned some time ago to continuous duty as the engineering member of the Surgical Neurology Branch, NINDB, research team studying the effects of high frequency irradiation on biological tissue. This has been very successful in terms of working relationships and work accomplishments. This team project has been in operation for several years and is expected to continue.

Program for instrument engineering through contracts

The large amount of engineering help required by the hundreds of NIH research laboratories makes it imperative for IEDB to use--in addition to its own staff engineers and fabrication shops--the broader, although geographically remote, facilities of commercial engineering firms. Thus, whenever the character of the engineering project allows, Branch engineers determine the needed engineering approach and technical specifications and assist

THE REQUESTING INSTITUTE IN SELECTION OF A QUALIFIED FIRM. DETAILED ENGINEERING IS PERFORMED BY THE CONTRACTOR UNDER THE GUIDANCE AND SUPERVISION OF THE IEDB ENGINEER; AT THE SAME TIME, THE IEDB ENGINEER ACTS AS A LIAISON BETWEEN THE FIRM AND THE NIH INVESTIGATOR. IN THIS WAY THE "LANGUAGE BARRIER" BETWEEN THE LIFE SCIENTIST AND THE CONTRACTING ENGINEER IS OVERCOME.

EXAMPLES OF SUCH CONTRACT PROJECTS HANDLED BY IEDB IN 1961 ARE:

A CONTRACT FOR THE NATIONAL HEART INSTITUTE FOR CONSTRUCTION OF A SECOND HEART-LUNG BY-PASS APPARATUS BASED ON NIH DESIGN. THE ORIGINAL NIH APPARATUS WAS DESIGNED AND CONSTRUCTED BY IEDB AND HAD BEEN IN CONTINUOUS USE IN THE CARDIAC OPERATING ROOM FOR OVER THREE YEARS. THE NEW APPARATUS IS FUNCTIONALLY THE SAME, BUT ARRANGED AND PACKAGED DIFFERENTLY FROM THE ORIGINAL UNIT. IEDB PERSONNEL PROVIDED ENGINEERING GUIDANCE TO THE COMMERCIAL FIRM DURING THE DESIGN AND ASSEMBLY STAGE, TESTED THE COMPLETED APPARATUS FOR SATISFACTORY OPERATION, AND PERFORMED ALL ENGINEERING MODIFICATIONS REQUIRED TO INCORPORATE THE COMMERCIAL BY-PASS DEVICE INTO THE EXISTING OPERATING ROOM MONITORING SYSTEM.

A CONTRACT TO MODIFY COMMERCIAL EQUIPMENT TO PROVIDE ADEQUATE COMPONENTS FOR THE WIRELESS OPERATING ROOM COMMUNICATION SYSTEM IS DESCRIBED LATER IN THIS REPORT. BASED ON IEDB SPECIFICATIONS, IT MAINLY INCORPORATES A VOICE OPERATED RELAY IN THE PORTABLE TRANSMITTER AND ADDS A DUAL RECEIVING UNIT.

OTHER CONTRACTS FOR MAJOR INSTRUMENTATION SYSTEMS ARE NOW UNDER NEGOTIATION OR IN PREPARATION.

LOCAL AREA FABRICATION SHOPS

DURING 1961 IEDB BROUGHT TWO NEW AREA SHOPS INTO FULL OPERATION: ONE FOR THE NATIONAL INSTITUTE OF DENTAL RESEARCH IN ITS NEW BUILDING, AND ONE FOR THE CLINICAL NEUROPHARMACOLOGY RESEARCH CENTER, NIMH, AT ST. ELIZABETHS HOSPITAL. UPON REQUEST BY THE NEW GERONTOLOGY BRANCH, NHI, IEDB HAS ALSO MADE RECOMMENDATIONS FOR THE PLANNING OF INSTRUMENTATION ENGINEERING FACILITIES AND FABRICATION SHOPS IN THE GERONTOLOGY BUILDING AT BALTIMORE CITY HOSPITAL. THE BRANCH'S RECOMMENDATIONS DEALT WITH STAFFING, SPACE REQUIREMENTS, GROUNDING AND UTILITY REQUIREMENTS, AND COST OF PERSONNEL, MACHINES, AND EQUIPMENT. SIMILAR COOPERATION WAS GIVEN THE NATIONAL CANCER INSTITUTE ON ITS REQUEST FOR PLANNING INSTRUMENTATION FACILITIES IN ITS PROPOSED NEW BUILDING AT NIH. ULTIMATELY, DESIGN DETAILS WILL ALSO BE FURNISHED TO THE ARCHITECT.

PROGRAMS ON DISSEMINATION OF ENGINEERING INFORMATION

DISSEMINATION OF KNOWLEDGE CONCERNING THE INSTRUMENT ENGINEERING PROGRESS ACHIEVED BY THE BRANCH IS CONSIDERED AN IMPORTANT FUNCTION OF THE IEDB STAFF. THIS IS ACHIEVED THROUGH PERSONAL

CONTACT WITH SCIENTISTS BOTH WITHIN AND OUTSIDE NIH, THROUGH THE PUBLICATION OF ARTICLES IN SCIENTIFIC JOURNALS, THROUGH LECTURES AND PAPERS PRESENTED AT PROFESSIONAL MEETINGS, AND THROUGH SUBMITTAL OF NEW INVENTIONS FOR PATENT CONSIDERATION. (SEE ATTACHED LISTING AT END OF TEXT OF THIS REPORT.)

ADVICE AND ASSISTANCE OUTSIDE NIH--AS IEDB'S EFFORTS IN THE FIELD OF BIOMEDICAL ENGINEERING BECOME BETTER KNOWN TO RESEARCHERS OUTSIDE NIH, THE NUMBER OF REQUESTS FOR INFORMATION ON SPECIFIC INSTRUMENTS AND FOR ADVICE AND ENGINEERING ASSISTANCE INCREASES. THE BRANCH IS COLLECTING MORE PRECISE STATISTICAL DATA ON THE NUMBER, CONTENT, AND SOURCE OF INQUIRIES IN ORDER TO FORMULATE A CONCRETE PLAN FOR FUTURE ACTIVITY IN THIS AREA.

GUIDED TOURS THROUGH IEDB FACILITIES--THERE WERE MANY INTERESTED GROUPS TOURING IEDB FACILITIES DURING 1961. DURING THE MEETING OF THE INTERNATIONAL FEDERATION FOR MEDICAL ELECTRONICS IN NEW YORK, A NUMBER OF MEDICAL SCIENTISTS AND ENGINEERS FROM FOREIGN COUNTRIES VISITED IEDB FACILITIES AT NIH. THREE RUSSIAN HEART SURGEONS ALSO VISITED THE BRANCH IN 1961. THEY WERE PARTICULARLY INTERESTED IN IEDB INSTRUMENTATION FOR THE CARDIAC OPERATING ROOM.

EDUCATIONAL PROGRAM IN BIOMEDICAL ENGINEERING

HIGH IN IMPORTANCE AMONG THE BRANCH'S LONG-RANGE PROGRAMS IS THE FOSTERING OF EDUCATION IN BIOMEDICAL ENGINEERING. A BIOMEDICAL ENGINEERING ACTIVITY PRESENTS UNUSUAL PROBLEMS IN THE FIELD OF EDUCATION. SINCE BIOMEDICAL ENGINEERING BRIDGES THE GAP BETWEEN THE TWO AS YET UNRELATED DISCIPLINES OF LIFE SCIENCE AND PHYSICAL SCIENCE, IT IS IMPERATIVE FOR ITS DEVELOPMENT AND SUCCESS THAT THE NATION'S SCHOOLS FIND A WAY OF UNITING THESE TWO DISCIPLINES. THE IEDB EDUCATIONAL ACTIVITY IS THUS DIRECTED NOT ONLY TOWARD THE MEMBERS OF THE BRANCH STAFF, BUT ALSO TOWARD THE PRESENT AND FUTURE YOUTH OF THIS COUNTRY ON WHOSE KNOWLEDGE AND TALENT THE FUTURE OF BIOMEDICAL ENGINEERING DEPENDS. SOME OF THE BRANCH'S ACTIVITIES IN THIS INTERDISCIPLINARY AREA DURING 1961 ARE HERE REPORTED:

TEN MEMBERS OF THE STAFF CONTINUED THEIR TRAINING IN 1961, TAKING COURSES IN THE FIELDS OF ELECTRONICS, ORGANIC CHEMISTRY, BIOMEDICAL ENGINEERING, AND PHYSIOLOGY. THESE COURSES ARE PROVIDING HIGHER TECHNICAL SKILLS AND INTERDISCIPLINARY BACKGROUND IN THE LIFE SCIENCES AND ENGINEERING.

IEDB PRESENTED A PAPER ON EDUCATIONAL REQUIREMENTS FOR BIOMEDICAL ENGINEERS AT THE EDUCATION FORUM OF THE FOUNDATION FOR INSTRUMENTATION EDUCATION AND RESEARCH (FIER) IN LOS ANGELES DURING THE 16TH ANNUAL MEETING OF THE INSTRUMENT SOCIETY OF AMERICA. THE NEED WAS STRESSED FOR INTERDISCIPLINARY TRAINING BOTH ON THE GRADUATE AND UNDERGRADUATE LEVELS OF THE ENGINEERING

curriculum. The same subject was discussed at the Engineer's Joint Council symposium on "Engineers in Medicine" in Boston. As a result of the Los Angeles and the subsequent EJC discussion, representatives of three universities have expressed interest in IEDB's proposal: The University of California, Case Institute of Technology, and Cornell University.

Another IEDB paper, "New Frontiers in Biomedical Engineering Education", presented in 1960 at the University of Vermont, was published in the October 1961 issue of IRE Transactions on Biomedical Electronics.

In July of this year, the Division of Research Grants requested IEDB to form a committee for review of fellowship applications for postgraduate study courses in biomedical engineering. These are given by various universities such as Drexel Institute of Technology, Johns Hopkins University, etc. The Fellowship Review Section of the National Heart Institute acts on this committee's recommendations.

Information retrieval program

In order to keep abreast of developments in biomedical instrumentation engineering outside NIH, IEDB staff members attended scientific meetings and lectures of particular interest to their areas of activity. Instrumentation developments of other research organizations, hospitals, universities, commercial and non-commercial research and manufacturing facilities were also visited and inspected.

The main scientific meetings attended in 1961 were the two annual conventions of the Instrument Society of America and the Institute of Radio Engineers, as well as this year's meeting of the International Federation for Medical Electronics which was held for the first time in the United States. Another important meeting was the International Conference on High Magnetic Fields at MIT, sponsored by the USAF Office of Scientific Research. Attendance at that conference resulted in recommendations to NINDB on additional engineering studies and modifications of the biological irradiation program. The main stress of the meeting of the Institute of Radio Engineers was on new developments of solid state physics which IEDB expects will play an increasing role in biomedical instrumentation, especially because of its applicability to digitalizing research results and measurements. "Micrologic" computer components and many other new commercial products were shown and discussed.

Leadership program in biomedical engineering

The Branch was active in stimulating interest in the newly emerging, interdisciplinary science of biomedical engineering and in creating awareness of its opportunities as well as its particular problems as follows.

Professional society activities--A member of the Branch is serving as Director of the Biomedical Sciences Division of the Instrument Society of America. The aim of this Division is to represent the professional engineer in all the important areas of biomedical instrumentation engineering such as electronics, optics, thermal dynamics, mechanics, sanitation, chemical engineering, fluid dynamics, nucleonics, etc.

IEDB engineers hold membership in these professional societies: Institute of Radio Engineers, Instrument Society of America, National Society for Professional Engineers, American Association for the Advancements of Science, the Society of Psychophysiological Research. Various Branch members were active in organizing biomedical engineering sessions for scientific meetings and conventions during the year.

Fostering student interest--Student groups at two universities were addressed on the subject of career opportunities in biomedical engineering.

Significant Contributions to the NIH Research Program

Intramural research

One of the major and more ambitious projects of the IEDB was brought to successful completion this year:

An automatic steroid analyzer--Developed for the Laboratory of Chemistry, NIAMD, it required over two years of engineering and fabrication. The analyzer is described in the accompanying Individual Project Report no. 8.6. During its construction and since its disclosure (at the 13th Annual Conference on Electrical Techniques in Medicine and Biology and in an article in Analytical Chemistry), the device has created considerable interest among biochemists in this country and abroad. The first prototype model has been in operation at the NIAMD Laboratory of Chemistry for the better part of 1961. Meanwhile, a program of continued improvement has been carried out, based on the experience of the engineers and chemists using the present model. Steroid extracting techniques have been improved

AND SEVERAL OF ITS AUTOMATIC FUNCTIONS HAVE BEEN SIMPLIFIED. SPECIFICATIONS ARE NOW UNDER PREPARATION IN IEDB FOR COMMERCIAL MANUFACTURE OF A SECOND MODEL BASED ON THE KNOWLEDGE AND EXPERIENCE GAINED FROM THE OPERATION OF THE FIRST PROTOTYPE.

IN ADDITION TO THOSE MAJOR PROJECTS DESCRIBED IN THE INDIVIDUAL PROJECT REPORTS, A FEW OTHER EXAMPLES OF THE PAST YEAR'S ENGINEERING DEVELOPMENTS FOLLOW:

DETECTOR-RECORDER FOR MEASURING CHANGES IN TEMPERATURE OF MYOCARDIAL TISSUE--A THERMISTOR SENSING PROBE IS USED IN CONJUNCTION WITH A TRANSISTORIZED DC AMPLIFIER TO MEASURE MINUTE CHANGES IN TISSUE TEMPERATURE WHEN REACTIVE DRUGS ARE INJECTED INTO THE BLOOD STREAM. THE SMALL SIGNAL CHANGE IS FURTHER AMPLIFIED AND RECORDED ON ONE CHANNEL OF A MULTI-CHANNEL RECORDER.

CONTROLLED COMBUSTION IN MUFFLE FURNACE--AN AUTOMATICALLY CONTROLLED SYSTEM HAS BEEN DEVELOPED FOR COMBUSTING TRITIATED HEMOGLOBIN IN A MODIFIED MUFFLE FURNACE ON A PRESET TIME AND TEMPERATURE PROGRAM. THE RATE OF TEMPERATURE CHANGE AND THE TIME OF MAXIMUM COMBUSTION ARE INDEPENDENTLY ADJUSTABLE ON THE CONTROL PANEL. AFTER MANUAL STARTING, THE MATERIAL IS MOVED THROUGH THE FURNACE AT THE PRESELECTED RATE, AND IS PROCESSED AUTOMATICALLY WITHOUT FURTHER HUMAN ASSISTANCE. AN ALARM SYSTEM IS ENERGIZED AT THE END OF THE CYCLE, ALERTING THE TECHNICIAN. THE CONTROL THEN PROCEEDS TO RESET ITSELF, READY FOR THE NEXT CYCLE. THE ENTIRE OPERATION WAS ORIGINALLY CARRIED OUT MANUALLY BY A TECHNICIAN, AND RESULTS WERE DIRECTLY RELATED TO THE SKILL OF THE OPERATOR. THE AUTOMATED SYSTEM REQUIRES ONLY LOADING AND UNLOADING BY THE TECHNICIAN, WHO IS THEN FREE TO PERFORM OTHER TASKS DURING THE PROCEDURE. USERS AT THE NATIONAL CANCER INSTITUTE CLAIM NOT ONLY SAVINGS IN TECHNICIANS' TIME BUT ALSO A SUBSTANTIAL IMPROVEMENT IN THE CONSTANCY AND QUALITY OF THE COMBUSTION PRODUCTS.

WIRELESS COMMUNICATION SYSTEM FOR NEUROSURGICAL OPERATING SUITE--A SYSTEM HAS BEEN DESIGNED AND COMPONENTS SELECTED FOR A MODERNIZED COMMUNICATION NETWORK IN THE FUTURE NEUROSURGICAL SUITE. COMMUNICATIONS WILL BE PROVIDED BETWEEN THE PATIENT, THE SURGEONS, THE OPERATORS OF TESTING AND RECORDING INSTRUMENTS, NURSES, AND OUTSIDE OBSERVERS. AN INTERESTING FEATURE OF THIS NETWORK IS THE TRANSISTORIZED TWO-WAY RADIO SETS PROVIDED FOR THE SURGICAL TEAM. THEIR LIGHT WEIGHT AND THE ELIMINATION OF WIRING ALLOWS SURGEONS AND NURSES TO MOVE AROUND FREELY. ON AND OFF SWITCHING OF EACH MICROPHONE IS DONE BY THE SOUND OF THE HUMAN VOICE, ELIMINATING THE NEED FOR THE SURGEON OR NURSE TO TAKE THEIR HANDS OFF THEIR MAIN TASKS. ANOTHER ADVANTAGE IS THE ELIMINATION OF LOOSE WIRES ON THE FLOOR OF THE OPERATING ROOM.

Changes and Improvements

Previous parts of the report dealt with Branch progress and accomplishments in the technical aspects of its operation. Simultaneous with these efforts to constantly improve its technical quality have been efforts of the Branch to increase the efficiency of its operation. The following paragraphs report on those developments and results:

Time Keeping and Material Handling

Last year's report described a streamlined time keeping system and record keeping system which the Branch had put into effect. By this system, the central NIH computer freed the valuable time of instrument makers and supervisors from purely clerical duties, thus avoiding wasteful time loss in the fabrication shops. The system continued to prove its value through the past year, not only by increasing the efficiency of the IEDB fabrication and repair operation, but also by presenting a simple and more reliable means of charging, billing, and accounting.

Efforts have been directed this year toward streamlining in a similar fashion the material handling procedures of the Branch; i.e., requisitioning of supplies, materials, and instrument components; expediting of deliveries; maintaining a stockpile on some materials and parts while procuring others from nearby retail or wholesale stocks as needed; supplying parts, materials, and components to IEDB engineers, fabricators, area shops, and repair crews, as well as to the program-connected instrument shops in the various Institutes. Two main steps have been initiated in this streamlining effort during the past year:

(a) Organization-wise, it has been recognized that the administrative operation of material handling should be removed from the supervision of fabrication supervisors and operated as a part of the administrative unit of the Branch. The Chief of the Fabrication Section, already heavily burdened with ever-increasing workload, would be freed of this responsibility, while material handling would benefit from the administrative training of its supervisor. Both of these results would enhance the efficiency of the Branch operation.

(b) A pilot study was started which is expected to point the way to automatic repurchasing of short items, more exact determination of stock level needs, closer control of stock items, and up-to-date unit costs for estimating and billing. The same pilot study will furnish information for determining needs and means for an inventory control system on some of the IEDB stock items.

Organization

In reviewing the engineering program of the Branch earlier in this report, the need for a breakdown of engineering projects into specialization fields was discussed. Such specialization was started this year in IEDB's engineering operation. It was paralleled by the simultaneous reorganization of the previous Instrument Engineering and Design Section into three sections: The Engineering Development Section, the Electronics Engineering Section, and the Mechanical Engineering Section. Members of the Development Engineering Section act as biomedical project engineers for all engineering projects referred to the Branch. They are specializing by area of medical application, one engineer handling all automation projects, another all bio-chemical analysis projects, or computer projects, physiological monitoring instrumentation, clinical instrumentation, etc. Where these projects require support of electronic or mechanical engineers, the other two Sections furnish the necessary specialized competence in their fields of engineering. The organization change is expected to provide higher quality of output and more satisfactory working conditions for the engineers of all three Sections. It allows each to achieve experience and knowledge in depth in his particular field of specialization, instead of forcing each one to spread his talents over as wide a field as biomedical engineering presents today.

Quality of Fabrication Work Output

The long-term program of the Branch of replacing obsolete precision equipment in the Instrument Fabrication Section is continuing. The new machines contribute greatly to improved quality and to speeding the end product to the investigator. In addition, the Section continues to inspect surplus Government property of other agencies, and has secured several thousand dollars worth of tools and equipment during the past year at no cost to NIH.

Problems

The problems of the Branch continue to be the long-range ones of interdisciplinary professional and technical training, adequate space, and determining ways and means of absorbing a constantly increasing workload.

Education and training problems are being met in the different ways outlined above. Because of the continuing shortage of engineers and skilled technicians, this problem is no less acute now than in previous years.

Detailed space plans have been developed for use in the near future, with emphasis on better utilization of existing space through removal of corridors and other non-productive areas. The reorganization of the stockroom is currently improving the space situation in the shop and stores area. However, with the continuously growing workload of the Branch and the addition of necessary new Branch developments such as the plastics activity, the present IEDB area is expected to become over-crowded and insufficient by the end of calendar year 1962.

The problem of absorbing additional workload occurs primarily in the professional engineering areas. Here the increased demand is due not only to growth of the NIH intramural program, but also to the spreading realization among medical investigators of the benefits of professional engineering assistance and of modern biomedical instrumentation to their research activities.

ATTACHMENT

INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH.

PUBLISHED ARTICLES, 1961	AUTHORS	JOURNAL
AUTOMATIC OPERATION OF GLASS STOPCOCKS	*F. O. ANDERSON *L. R. CRISP	CHEMIST-ANALYST, VOL. 50, NO.1, P.22, MARCH 1961
PHOTOGRAPHIC MICROSCOPE FOR BOTH MICRO AND MACRO APPLICATION	*G. F. NORRIS F. H. MEILLER *K. T. BOLEN *L. R. CRISP	JOURNAL OF THE OPTICAL SOCIETY OF AMERICA, VOL.51, NO.4, PP.445-6, APRIL 1961
A SERVO-CONTROLLED pH STAT	M. MURAYAMA *J. M. CONLON *G. C. RIGGLE	ANALYTICAL CHEMISTRY, VOL.33, NO.11, PP.1606, OCTOBER 1961
STEROID ANALYZER	*F. O. ANDERSON *L. R. CRISP *G. C. RIGGLE *G. G. VUREK E. HEFTMANN DAVID JOHNSON, ET AL	ANALYTICAL CHEMISTRY, VOL.33, NO.11, PP.1606, OCTOBER 1961

ATTACHMENT

INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH

PAPERS PRESENTED AT MEETINGS, 1961	AUTHORS	MEETING
A THERMAL DILUTION TECHNIQUE FOR THE DETECTION OF CIRCULATORY SHUNTS: INSTRUMENTATION	*G. C. RIGGLE THEODORE COOPER	1961 SAN DIEGO BIOMEDICAL ENGINEERING SYMPOSIUM, SAN DIEGO, CALIFORNIA, APRIL 1961. PRINTED IN PROCEEDINGS OF SYMPOSIUM
ELECTRONIC SHUTTER	*J. M. CONLON *G. C. RIGGLE	4TH INTERNATIONAL CONFERENCE ON MEDICAL ELECTRONICS, NEW YORK, JULY 1961. PRINTED IN DIGEST OF CONFERENCE
INSTRUMENTATION OF A NEUROSURGICAL OPERATING ROOM	*G. S. COHEN	16TH ANNUAL MEETING, INSTRUMENT SOCIETY OF AMERICA, LOS ANGELES, CALIFORNIA, SEPTEMBER 1961. CONFERENCE PREPRINT NO. 11-LA-61.

PATENT SUGGESTIONS DURING 1961

DURING 1961 TWO INVENTIONS WERE SUBMITTED TO NIH FOR PATENT CONSIDERATION:

1. AUTOMATIC PIPETTE PLUGGING MACHINE
   (TECHNICAL DETAILS DESCRIBED IN THE IEDB ANNUAL REPORT FOR 1960)

2. AUTOMATIC DEVICE FOR WITHDRAWAL AND RECORDING OF NUCLEIC ACID SAMPLES
   (DESCRIBED IN THIS REPORT UNDER INDIVIDUAL PROJECT REPORT NO. 8.2)

* MEMBERS IEDB STAFF

(ATTACHMENT 1)

SERIAL NO. 8.1
1. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
2. ENGINEERING DEVELOPMENT SECTION
3. BETHESDA, MARYLAND

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART A.

PROJECT TITLE: DESIGN OF INSTRUMENTATION SYSTEM FOR THE OPERATING SUITES IN BUILDING 10A

PRINCIPAL INVESTIGATOR: GERALD S. COHEN

COOPERATING UNIT: NATIONAL HEART INSTITUTE; NATIONAL INSTITUTE OF NEUROLOGICAL DISEASES AND BLINDNESS

MAN YEARS (CALENDAR YEAR 1961):
TOTAL: 1.0
PROFESSIONAL: .7
OTHER: .3

PROJECT DESCRIPTION:

OBJECTIVE--THE INSTRUMENTATION IN THE NEW OPERATING ROOMS WILL UTILIZE THE LATEST TECHNOLOGICAL ADVANCES IN THE FIELD OF BIOMEDICAL INSTRUMENTATION TO PROVIDE A WELL ENGINEERED, INTEGRATED MONITORING, DISPLAY, AND RECORDING SYSTEM. EMPHASIS HAS BEEN PLACED ON THE HUMAN ENGINEERING ASPECTS OF THE PROBLEM CONSIDERING THE PATIENT, THE SURGICAL TEAM, THE ENCEPHALOGRAPHER OR CARDIOGRAPHER, AND THE NURSING STAFF.

METHODS EMPLOYED--A PHYSIOLOGICAL MONITORING SYSTEM WAS SELECTED THAT DISPLAYS IN THE OPERATING ROOM IN DIGITAL FORM THE BLOOD PRESSURE, HEART RATE, TEMPERATURE, AND BLOOD FLOW OF THE PATIENT. THE BASIC SYSTEM ALSO PROVIDES FOR THE RECORDING OF AS MANY AS 24 PARAMETERS ON A PRINTED CHART AND ON AN 8-CHANNEL PHOTOGRAPHIC RECORDER WITH INSTANT DEVELOPING FACILITIES. TO THIS BASIC MONITORING ARRANGEMENT, TAPE RECORDING, COMMUNICATIONS, CAUTERY, DEFIBRILLATION AND STIMULATING SUB-SYSTEMS WERE ADDED TO FORM A COMPLETE AND INTEGRATED OPERATING ROOM INSTRUMENTATION SYSTEM. PEDESTALS WERE DESIGNED FOR THE OPERATING ROOMS AND THE ANESTHESIA ROOMS TO PROVIDE GAS, WATER, POWER AND OTHER SERVICES CONVENIENTLY NEAR THEIR POINT OF UTILIZATION.

SIGNIFICANCE TO BIOMEDICAL RESEARCH--THE NEW INSTRUMENTATION SYSTEMS WILL YIELD IMPROVED CARE FOR PATIENTS UNDERGOING SURGERY BY PROVIDING THE SURGEONS AND ANESTHESIOLOGISTS WITH AN INSTANTANEOUS DISPLAY OF THE IMPORTANT PHYSIOLOGICAL MEASUREMENTS. IN ADDITION THE COMPLETE AND FLEXIBLE RECORDING SYSTEM WILL FACILITATE THE FUTURE RECOVERY AND ANALYSIS OF ALL ESSENTIAL DATA OBTAINED IN THE COURSE OF A SURGICAL PROCEDURE.

PART B INCLUDED: YES

(ATTACHMENT 1)

SERIAL NO. 8.1

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART B. HONORS, AWARDS, AND PUBLICATIONS

PUBLICATIONS OTHER THAN ABSTRACTS FROM THIS PROJECT:

GERALD S. COHEN, INSTRUMENTATION OF A NEUROSURGICAL OPERATING ROOM. PRESENTED AT 16TH ANNUAL MEETING, INSTRUMENT SOCIETY OF AMERICA; LOS ANGELES; SEPTEMBER 1961

(ATTACHMENT 1)

SERIAL NO. 8.2
1. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
2. MECHANICAL ENGINEERING SECTION & ELECTRONICS ENGINEERING SECTION
3. BETHESDA, MARYLAND

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART A.

PROJECT TITLE: AUTOMATIC DEVICE FOR WITHDRAWAL AND RECORDING OF NUCLEIC ACID SAMPLES

PRINCIPAL INVESTIGATOR: GEORGE NORRIS

OTHER INVESTIGATOR: JOHN K. CULLEN

COOPERATING UNIT: NATIONAL INSTITUTE OF MENTAL HEALTH, LABORATORY OF CELLULAR PHARMACOLOGY

MAN YEARS (CALENDAR YEAR 1961):
TOTAL: .15
PROFESSIONAL: .10
OTHER: .05

PROJECT DESCRIPTION:

OBJECTIVE--PURPOSE OF THE APPARATUS IS TO AUTOMATE SOME OF THE LABORATORY PROCEDURES INVOLVED IN NUCLEIC ACID ANALYSIS. FRACTIONS COLLECTED BY THE INVESTIGATOR DURING NORMAL WORKING HOURS ARE AUTOMATICALLY ANALYZED THROUGH A SPECTROPHOTOMETER DURING THE NIGHT HOURS WITHOUT HUMAN ATTENDANCE. THIS PREPROGRAMMED, AUTOMATICALLY CONTROLLED ANALYSIS SYSTEM WAS DESIGNED FOR A LABORATORY WHERE LARGE NUMBERS OF FRACTION SAMPLES HAVE TO BE ANALYZED.

METHODS EMPLOYED--SAMPLES ARE COLLECTED IN A FRACTION COLLECTOR IN THE USUAL MANNER. A QUARTZ CELL SPECIFICALLY DESIGNED FOR THE DEVICE IS PLACED IN THE SAMPLE COMPARTMENT OF A SPECTROPHOTOMETER. SAMPLE MATERIAL IN THE FRACTION COLLECTOR TEST TUBE IS DRAWN INTO THE QUARTZ CELL BY PLASTIC CAPILLARY WITHDRAWAL TUBING CONNECTED TO A VACUUM SYSTEM.

UPON STARTING THE MACHINE, A TIMING PROGRAMMER LOWERS THE WITHDRAWAL TUBING INTO THE TEST TUBE OF THE FRACTION COLLECTOR, ENERGIZES THE VACUUM SYSTEM FOR WITHDRAWAL OF

THE SAMPLE INTO THE QUARTZ CELL, AND ACTUATES THE SPECTROPHOTOMETER. AFTER THE PHOTOMETRIC READING IS RECORDED, THE SAMPLE IS RETURNED INTO ITS TEST TUBE AND THE FRACTION COLLECTOR IS ADVANCED TO THE NEXT TEST TUBE POSITION.

THE OPERATION REPEATS AUTOMATICALLY UNTIL THE LAST SAMPLE IS READ, AFTER WHICH THE SYSTEM TURNS ITSELF OFF.

SAMPLES AS SMALL AS 1 CC. MAY BE READ ACCURATELY.

SIGNIFICANCE TO BIOMEDICAL RESEARCH--OF MAJOR IMPORTANCE IS THE INCREASED SPEED OF ANALYZING SAMPLES AND THE MORE EFFICIENT USE OF EXPENSIVE LABORATORY APPARATUS. THE AUTOMATION SYSTEM IS ADAPTABLE TO VARIOUS TYPES OF SPECTROPHOTOMETERS AND MAY BE ADJUSTED TO RECORD A WIDE RANGE OF SPECTROPHOTOMETRIC VALUES.

INVENTION REPORT HAS BEEN FILED FOR PATENT INVESTIGATION.

PART B INCLUDED: NO

(ATTACHMENT 1)

SERIAL NO. 8.3
1. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
2. ELECTRONICS ENGINEERING SECTION
3. BETHESDA, MARYLAND

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART A.

PROJECT TITLE: PORTABLE DENSITOMETER FOR MEASURING AMOUNT OF DIRT ADHERING TO A SAMPLING STRIP OF PELLON

PRINCIPAL INVESTIGATOR: JOHN K. CULLEN

OTHER INVESTIGATORS: DR. L. G. HERMAN, R. J. WEATHERBY

COOPERATING UNIT: DIVISION OF RESEARCH SERVICES, ENVIRONMENTAL SERVICES BRANCH

MAN YEARS (CALENDAR YEAR 1961):
TOTAL: .2
PROFESSIONAL: .1
OTHER: .1

PROJECT DESCRIPTION:

OBJECTIVE--TO DEVELOP A SCIENTIFIC MEANS OF MEASURING THE AMOUNT OF DIRT REMOVED FROM ANY SMOOTH SURFACE BY A DIRT SAMPLING DEVICE. THE INSTRUMENT IS OF POCKET SIZE FOR EASE OF PORTABILITY, IS SELF-POWERED WITH LONG-LIFE BATTERIES, AND IS OF RUGGED CONSTRUCTION AND SIMPLE TO OPERATE AND READ.

EQUIPMENT--A SMALL, LIGHTWEIGHT, TRANSISTORIZED DENSITOMETER WAS DESIGNED AND PACKAGED IN A CASE ABOUT THE SIZE OF A CIGARETTE PACK. A CONTROLLABLE ADJUSTMENT PERMITS PAPERS OF DIFFERENT OPACITIES TO BE USED. THE INSTRUMENT IS POWERED BY BATTERIES LASTING FOR SEVERAL WEEKS. THE CASE IS DESIGNED TO WITHSTAND MODERATELY ROUGH TREATMENT.

METHODS EMPLOYED--A 4" x 1" STRIP OF TRANSLUCENT PELLON IS HELD IN A SPECIALLY DESIGNED HOLDER AND PLACED IN CONTACT WITH THE SURFACE TO BE TESTED. THE HOLDER IS MOVED PARALLEL TO THE SURFACE FOR A PRESCRIBED DISTANCE UNDER CONSTANT PRESSURE. THE PELLON STRIP IS THEN REMOVED AND

PLACED IN THE PORTABLE DENSITOMETER WHICH DETECTS THE CHANGES IN LIGHT TRANSMISSION DUE TO DIRT PARTICLE IMPREGNATION. THE CHANGES ARE INDICATED ON A METER.

SIGNIFICANCE TO BIOMEDICAL RESEARCH--THE PELLON STRIP AND DENSITOMETER PROVIDE HOSPITAL HOUSEKEEPERS WITH A RELIABLE, OBJECTIVE MEANS OF DETERMINING THE EFFECTIVENESS OF THEIR CLEANING PROCEDURES. BY ESTABLISHING STRICT STANDARDS OF CLEANLINESS AND MAINTAINING THESE LEVELS THROUGH THE USE OF THIS INSTRUMENT, THE OVERALL SANITATION IN ANY HOSPITAL AREA MAY BE GREATLY IMPROVED. SURFACES SUCH AS FLOORS, WALLS, CEILINGS, WINDOWS. TABLE TOPS, INTERIORS OF BATH TUBS AND WASH BASINS, ETC., CAN BE STUDIED BEFORE AND AFTER THE CLEANING PROCEDURES SO THAT THE EFFICIENCY OF THESE PROCEDURES MAY BE DETERMINED AND STANDARDS DEVELOPED FOR NATIONWIDE USE.

PART B INCLUDED: NO

(ATTACHMENT 1)

SERIAL NO. 8.4
1. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
2. INSTRUMENT FABRICATION SECTION
3. BETHESDA, MARYLAND

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART A.

PROJECT TITLE: FIVE BARREL GLASS MICROPIPETTES

PRINCIPAL INVESTIGATORS: WILLIAM KUMP, PAUL DIRLIK, WARREN FOSTER

OTHER INVESTIGATOR: DR. G. SALMOIRAGHI

COOPERATING UNIT: NATIONAL INSTITUTE OF MENTAL HEALTH, CLINICAL NEUROPHARMACOLOGY RESEARCH CENTER

MAN YEARS (CALENDAR YEAR 1961):
TOTAL: .2
PROFESSIONAL: --
OTHER: .2

PROJECT DESCRIPTION:

OBJECTIVE--THE DEVICE IS DESIGNED TO PERMIT THE INVESTIGATOR TO CARRY OUT SEVERAL INJECTION AND RECORDING STUDIES SIMULTANEOUSLY IN EXPERIMENTAL PHARMACOLOGICAL STUDIES ON SINGLE NEURONS. SINGLE BARREL PIPETTES REQUIRE A RELATIVELY LARGE AREA AND ONLY ONE FUNCTION CAN BE PERFORMED AT A TIME, WHICH LOWERS THE DEPENDABILITY AND VALUE OF THE RESEARCH PROCEDURE.

METHODS EMPLOYED--THE MULTIPLE BARREL PIPETTE IS CONSTRUCTED OF FOUR 3-MM GLASS TUBES CAREFULLY ORIENTED ABOUT AN ADDITIONAL 3-MM TUBE USED AS AN AXIS. THE TUBES ARE THEN FUSED AND CAREFULLY DRAWN DOWN THROUGH A SERIES OF 8 STEPS TO A 5-7 MICRON GROSS DIAMETER. THE INSIDE OF EACH MICROPIPETTE IS APPROXIMATELY 1 MICRON. TECHNIQUES HAVE BEEN PERFECTED TO MANUFACTURE THE PIPETTES ON A ROUTINE BASIS.

SIGNIFICANCE TO BIOMEDICAL RESEARCH--THE DEVICE MAKES POSSIBLE AN IMPROVED METHOD OF CONDUCTING STUDIES ON NEURONS AND CELLS BY ENABLING THE INVESTIGATOR TO INJECT RELATED DRUG FLUIDS SIMULTANEOUSLY AND RECORD THE RESULTANT CHANGE IN ELECTRICAL ACTIVITY IN A SINGLE MANIPULATION OF THE PIPETTE.

PART B INCLUDED: NO

(ATTACHMENT 1)

SERIAL NO. 8.5
1. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
2. ELECTRONICS ENGINEERING SECTION
3. BETHESDA, MARYLAND

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART A.

PROJECT TITLE: RADIO FREQUENCY ENERGY EFFECTS ON BIOLOGICAL MATERIALS

PRINCIPAL INVESTIGATOR: WILLIAM PEARLMAN

OTHER INVESTIGATORS: DR. M. BALDWIN, DR. J. ADAMKIEWICZ

COOPERATING UNIT: NATIONAL INSTITUTE OF NEUROLOGICAL DISEASES AND BLINDNESS, SURGICAL NEUROLOGY BRANCH

MAN YEARS (CALENDAR YEAR 1961):
TOTAL: 1.3
PROFESSIONAL: 1.0
OTHER: .3

PROJECT DESCRIPTION:

OBJECTIVE--THIS PROJECT IS A CONTINUATION OF PROJECT SERIAL NO. 8.7 DESCRIBED IN THE 1960 REPORT. THE RESEARCH PROJECT AIMS AT DETERMINING THE EFFECTS OF HIGH-DENSITY RADIO FREQUENCY IRRADIATION ON BIOLOGICAL TISSUE. THE STUDY IS CONDUCTED BY A TEAM CONSISTING OF SCIENTISTS OF THE SURGICAL NEUROLOGY BRANCH, NINDB AND AN ELECTRONIC ENGINEER OF THE INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH, DRS. THIS REPORT COVERS THIS YEAR'S ENGINEERING CONTRIBUTION TO THE RESEARCH PROJECT, MAINLY IN THE FIELD OF INSTRUMENTATION.

METHODS EMPLOYED--STUDIES WERE CONDUCTED IN THE RANGE OF 220 TO 400 MEGACYCLES WITH SPECIAL EMPHASIS ON THE DEVELOPMENT OF CAVITY RESONATORS WITH IMPROVED FIELD PROPOGATION PATTERNS. A SIGNIFICANT ADVANCE WAS MADE IN THE TRANSFER OF RADIO FREQUENCY ENERGY THROUGH A TRANSVERSE FIELD PATTERN, AND FURTHER STUDIES IN THIS AREA ARE PLANNED.

LOW LEVEL RADIO FREQUENCY ENERGY RANGING FROM 5 TO 30 MEGACYCLES IS BEING APPLIED TO AQUEOUS SOLUTIONS AND LATER TO BIOLOGICAL FLUIDS AND CELLS TO DETERMINE THE EFFECTS

OF ABSORBED ENERGY.

INSTRUMENTATION IS BEING DEVELOPED TO MEASURE EFFECTS SUCH AS TEMPERATURE, PRESSURE AND SIMILAR PHENOMENA DURING IRRADIATION OF GROSS AS WELL AS SMALL SAMPLES.

SIGNIFICANCE TO BIOMEDICAL RESEARCH--THE MEASUREMENT OF BIOLOGICAL CHANGES CAUSED BY RADIO FREQUENCY ENERGY IS AN IMPORTANT FACTOR IN UNDERSTANDING THE POSSIBLE HARMFUL EFFECTS TO BIOLOGICAL TISSUE. RESPONSE AT VARIOUS WAVELENGTHS WILL ALSO BE OF CONSIDERABLE VALUE IN THE MEASUREMENT OF TISSUE DENSITY.

PART B INCLUDED: No

(ATTACHMENT 1)

SERIAL NO. 8.6
1. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
2. MECHANICAL ENGINEERING SECTION, ELECTRONICS ENGINEERING SECTION, ENGINEERING DEVELOPMENT SECTION
3. BETHESDA, MARYLAND

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART A.

PROJECT TITLE: AUTOMATIC STEROID ANALYZER

PRINCIPAL INVESTIGATORS: F. O. ANDERSON, L. R. CRISP, G. C. RIGGLE, G. G. VUREK

OTHER INVESTIGATORS: DR. E. HEFTMANN, DR. D. JOHNSON, D. FRANCOIS, T. PERRINE

COOPERATING UNIT: NATIONAL INSTITUTE OF ARTHRITIS AND METABOLIC DISEASES, LABORATORY OF CHEMISTRY

MAN YEARS (CALENDAR YEAR 1961):
TOTAL: 2.0
PROFESSIONAL: 1.5
OTHER: .5

PROJECT DESCRIPTION:

OBJECTIVE--TO DEVELOP AN APPARATUS FOR THE AUTOMATIC QUANTITATIVE DETERMINATION OF INDIVIDUAL ADRENOCORTICAL HORMONES IN MIXTURES. IT IS BASED ON THE SEPARATION OF THE MIXTURE ON A PARTITION COLUMN BY GRADIENT ELUTION. FRACTIONS ARE COLLECTED AND DIVIDED INTO TWO EQUAL ALIQUOTS. ONE IS ANALYZED BY ULTRAVIOLET ABSORPTION, THE OTHER BY THE REDUCTION OF BLUE TETRAZOLIUM. AS MANY AS 300 ANALYZED SAMPLES MAY BE STORED AND THE RESULTS RECORDED ON THE STRIP CHART. THE DESIGN OF THE APPARATUS EMPHASIZES FLEXIBILITY AND SAFETY OF OPERATION. IT FACILITATES THE QUANTITATIVE DETERMINATION OF INDIVIDUAL CORTICOSTEROIDS WHICH IS APPLICABLE TO THE ANALYSIS OF URINE AND TISSUE EXTRACTS, AND--WITH MINOR MODIFICATIONS--TO 17-KETOSTEROIDS AS WELL.

THE STATIONARY PHASE IN THE PARTITION SYSTEM IS WATER, SUPPORTED BY A SILICIC ACID COLUMN. GRADIENT ELUTION WITH PETROLEUM ETHER, CONTAINING INCREASING AMOUNTS OF DICHLOROMETHANE, SEPARATES THE STEROIDS. THE ELUATE FRACTIONS ARE ANALYZED BY BOTH ULTRAVIOLET SPECTROMETRY AND A COLORIMETRIC PROCEDURE, BASED ON THE REDUCTION OF BLUE TETRAZOLIUM (BT). THE SAMPLES CAN BE FURTHER USED AFTER ANALYSIS FOR THE SULFURIC ACID TEST, PAPER CHROMATOGRAPHY, OR RADIOCHEMICAL ASSAY.

METHODS EMPLOYED--THE AUTOMATIC STEROID ANALYZER CONSISTS OF THE APPARATUS PROPER, OCCUPYING A FLOOR SPACE OF 6' X 3½', AND TWO ELECTRONIC CONTROL RELAY RACKS. THE SOLVENT AND REAGENT CONTAINERS ARE FILLED AND THE TEST TUBES PLACED IN CONTAINERS. AFTER THE PACKED COLUMN IS PLACED IN POSITION, THE MASTER PROGRAMMER IS ENERGIZED AND CYCLING BEGINS. PETROLEUM ETHER AND DICHLOROMETHANE ARE PUMPED INTO A MIXING CHAMBER ACCORDING TO ANY DESIRED GRADIENT ELUTION PROGRAM. THE MIXTURE OF STEROIDS IS SEPARATED ON THE COLUMN AND THE EFFLUENT IS COLLECTED IN TEST TUBES. EACH EFFLUENT FRACTION IS DIVIDED INTO TWO EQUAL PORTIONS, ONE FOR UV AND ONE FOR BT ANALYSIS. THE SOLVENTS ARE EVAPORATED, AND THE RESIDUE IS TAKEN UP IN ETHYL ALCOHOL. A BLANK TUBE CONTAINING THE SAME AMOUNT OF ETHYL ALCOHOL IS PREPARED FOR COMPARISON WITH THE BT COLUMN. AFTER SUITABLE AGITATION, THE COLOR REAGENTS ARE ADDED TO THE COLOR AND BLANK TUBES AND THEIR CONTENTS ARE AGAIN MIXED. SOME TIME LATER, THE ABSORBENCIES OF THE TWO TUBES ARE COMPARED AT 520 MU, AND THE ULTRAVIOLET ABSORPTION AT 240 MU IN THE UNTREATED ALIQUOT IS DETERMINED. THE SIGNALS FOR THE TWO SPECTROMETRIC DETERMINATIONS ARE RECORDED ON THE STRIP CHART.

SIGNIFICANCE TO BIOMEDICAL RESEARCH--IN COMPARING THE TWO MAIN FORMS OF LIQUID-LIQUID PARTITION CHROMATOGRAPHY AS APPLIED TO CORTICOSTEROIDS, IT WAS FOUND THAT COLUMNS ARE MORE SUITABLE FOR QUANTITATIVE AND PREPARATIVE WORK THAN FILTER PAPER. IF COLUMN CHROMATOGRAPHY HAS NOT ENJOYED THE SAME POPULARITY AS PAPER CHROMATOGRAPHY, IT IS LARGELY BECAUSE OF THE LABOR INVOLVED IN ANALYZING INDIVIDUAL FRACTIONS. THE AUTOMATIC STEROID ANALYZER THUS FILLS THE NEED FOR A DEVICE CAPABLE OF FACILITATING THE LABORATORY PROCEDURES OF COLUMN CHROMATOGRAPHY THROUGH AUTOMATION. DURING ITS UNATTENDED RUN, THE APPARATUS PERFORMS CHROMATOGRAPHIC FRACTIONATION AND RECORDING OF SPECTROPHOTOMETRIC DETERMINATION OF THE STEROIDS.

PART B INCLUDED: YES

(ATTACHMENT 1)

SERIAL NO. 8.6

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART B. HONORS, AWARDS, AND PUBLICATIONS

PUBLICATIONS OTHER THAN ABSTRACTS FROM THIS PROJECT:

G. C. RIGGLE, F. O. ANDERSON, L. R. CRISP, E. HEFTMANN, D. F. JOHNSON, AUTOMATIC DEVICE FOR FRACTIONATION AND SPECTROPHOTOMETRIC DETERMINATION OF STEROIDS. DIGEST OF TECHNICAL PAPERS, 13TH ANNUAL CONFERENCE ON ELECTRICAL TECHNIQUES IN MEDICINE AND BIOLOGY, FIRST EDITION; PP. 88-89, OCTOBER 1960

F. O. ANDERSON, L. R. CRISP, G. C. RIGGLE, G. G. VUREK, E. HEFTMANN, D. F. JOHNSON, D. FRANCOIS, T. D. PERRINE, STEROID ANALYZER, ANALYTICAL CHEMISTRY; VOL. 33; P. 1606, OCTOBER 1961.

(ATTACHMENT 1)

SERIAL NO. 8.7
1. INSTRUMENT ENGINEERING AND DEVELOPMENT BRANCH
2. INSTRUMENT FABRICATION SECTION
3. BETHESDA, MARYLAND

PHS-NIH
INDIVIDUAL PROJECT REPORT
CALENDAR YEAR 1961

PART A.

PROJECT TITLE: CONDUCTIVE PLASTIC MEMBRANE ELECTRODE FOR DETECTING LOW LEVEL ERG SIGNALS OF THE EYE

PRINCIPAL INVESTIGATOR: JOHN W. BORETOS

COOPERATING UNIT: NATIONAL INSTITUTE OF NEUROLOGICAL DISEASES AND BLINDNESS, OPHTHALMOLOGY BRANCH

MAN YEARS (CALENDAR YEAR 1961):
TOTAL: .05
PROFESSIONAL: --
OTHER: .05

PROJECT DESCRIPTION:

OBJECTIVE--IN ORDER TO RECORD THE SMALL VOLTAGE SIGNALS WHICH APPEAR ON THE RETINA OF THE EYE WITHOUT DISTURBING THE PATIENT'S SIGHT AND COMFORT, AN ELASTOMERIC MEMBRANE TYPE ELECTRODE CONFORMING TO THE SURFACE OF THE EYE WAS NEEDED USING A HIGH CONDUCTIVE PLASTIC MATERIAL FOR DETECTION AND CONDUCTION OF THE SIGNALS.

METHODS EMPLOYED--ATTEMPTS WERE MADE INITIALLY TO USE COMMERCIALLY AVAILABLE CONDUCTIVE PLASTIC MATERIALS FOR CARRYING THE SMALL ELECTRICAL SIGNALS TO THE EYE. THE ELECTRICAL "NOISE" GENERATED BY THE PLASTIC FLEXING UNDER EYE MOVEMENTS AND THE HIGH RESISTIVITY WERE UNSUITABLE FOR RECORDING THE GENERATED SIGNAL. INVESTIGATION AND RESEARCH WERE THEREFORE DIRECTED TOWARD FINDING A MATERIAL WHICH WOULD AVOID THESE DIFFICULTIES. A SUITABLE CONDUCTIVE PLASTIC MATERIAL WAS FINALLY ARRIVED AT BY INCORPORATING FINELY-DIVIDED SILVER DUST INTO LOW VISCOSITY FLEXIBLE VINYL PLASTISOL. THE MATERIAL WAS MOLDED ALONG WITH OTHER NON-CONDUCTIVE ELASTOMER INTO THE FINAL ELECTRODE SHAPE TO FIT THE EYE CONTOUR.

Significance to Biomedical Research--The new plastic material is highly conductive and flexible. It can be formed into many shapes to fit varying body contours. It is hoped that prolonged experimentation will prove it to be sufficiently free of flexing noise for its use in ophthalmological research, and that it will stay snugly on the cornea so as to move with it. This would stabilize responses and permit more sensitive measurements of the ERG signals.

An invention report for patent investigation is in preparation.

Part B included: No

Calendar Year 1961

PUBLIC HEALTH SERVICE - NATIONAL INSTITUTES OF HEALTH

DIVISION OF RESEARCH SERVICES

Summary of Branch Activities

1. DRS-9
Serial Number

2. LIBRARY BRANCH
Branch

3. Malcolm S. Ferguson
Acting Branch Chief

Objectives

The Library exists to provide technical literature resources in support of the research programs of the Institutes and their administration. Its services include the acquisition, organization and circulation of books, periodicals, reports and other library materials; the provision of reference and bibliographic assistance; the translation of foreign literature; and a photocopying service. In these activities the Library must be responsive to the ever-changing literature needs of the investigator and alert to new and improved methods of information retrieval, manipulation and dissemination.

Summary of Progress

In all areas of the Library, routine activities have been under review during the year, and many simplifications were put into effect. Emphasis has been placed on means of rendering the best possible service to the research and administrative staffs that the resources of the Branch will allow. Two Xerox Photocopiers are in operation full time to provide immediate copy of journal articles for research use. Book purchasing has increased to over $40,000 from a level of $11,000 in 1960, thus permitting a considerable expansion of the collection. Acquisition and cataloging procedures have kept pace with the increase in the volumes acquired. Four professionally qualified librarians have been added to the staff. The binding program to make the journal collection permanently useable has been stepped up considerably above the 1960 level. Stack maintenance has become more efficient, with systematic and prompt shelving a primary requirement. The reference area has been partially rearranged for better service. Outside contracts, oral translations, and recording equipment have been initiated and these are being studied as means for more effective translating service. A Group Services Unit was initiated to provide a centralized service for borrowing material not available in the Branch through interlibrary loan and to orient NIH personnel in the use of the Library. The satellite library in the Research Facilities Planning Branch is now fully established for support of the facilities construction projects.

Binding Program. Over two thousand more journal volumes were prepared for original binding and sent to the bindery in calendar year 1961 than in 1960. In all, 5,500 journal volumes were handled. The crash binding program initiated in July of 1960 concentrated on the rebinding of badly worn and soiled bound volumes of periodicals. In 1961, however, the emphasis was almost entirely on new binding, a more time-consuming procedure since all the issues of each volume must be located, assembled, and binding instructions prepared. There is still a large backlog of unbound periodicals, a situation that will exist for some time, even with the effort that is being expended on the program.

Maintenance of the Collection. A concerted effort has been made to keep the book and journal collections in better order in the stacks and to shelve material promptly after it has been used. Since the Library has its book and journal shelves open to its clientele, it must insure that the collection is readily available and useable. As the binding program progresses, the maintenance effort will be lessened because of the decrease in the number of unbound journals on the shelves.

Translating Service. Efforts were continued to determine the most effective translating service for NIH needs. Outside contractual service has been initiated and it proved, on the whole, to be satisfactory. Additional recording equipment was purchased. Emphasis has been given to oral translations. This has led to the lowering of the priorities for written translations and has contributed to a large backlog of work, a problem that is now under study. Distribution of translations into English to libraries and scientists in the United States and foreign countries continues to expand. This distribution includes courtesy copies to authors of the more recent papers that have been translated. The list, Recent Translations, has been issued monthly for distribution and for pickup in the Library.

Reference Service. The Library reference area was partially rearranged for better service. The entire collection has been reviewed for selection of new titles and current editions to revitalize the basic information materials. With the increase in the level of book purchasing, the reference collection is now being built up to support the future development of the reference and bibliographic services. In the reference service, emphasis is being placed on providing the NIH research staff with immediate answers to questions and ready reference, with the preparation of bibliographies and larger projects having a lower priority at this time. Three professional librarians were added to the reference staff this year.

Group Services. A Group Services Unit has been set up to administer and improve the interlibrary loan activities, which, during 1961, amounted to the borrowing of 10,000 volumes from other libraries. The Unit will also give library orientation talks to groups and individuals as has been done by one or more of the sections in the past. However, this indoctrination into the resources and use of the Library should be systematized and expanded. Certain other needed library services will become the responsibility of the Group Services Unit as it develops.

DRS, Library Branch, cont'd:

Satellite Library. A library and reference room has now been established in the Research Facilities Planning Branch. The librarian is a member of the staff of the Library Branch and is responsible in matters relating to library science to the Office of the Librarian and in matters relating to the Research Facilities Planning Branch and its needs to the Chief, RFPB. Assistance is given by all Sections of the Library Branch on any problems which arise. Book and journal acquisition and cataloging are centralized in the Library Branch, which allows the librarian in RFPB to concentrate on the provision of service. The RFPB Library is the initiation of a satellite system which it is hoped will be expanded. Negotiations are presently underway with the Mental Health Study Center for a similar library.

Staff. Recruitment continues for a competent and experienced person to fill the position of Chief, Library Branch, that was vacated in February 1961. The addition during the year of four professionally trained librarians represents a step toward obtaining an adequately qualified library staff. Several full-time nonprofessional personnel were employed to assist in the circulation, acquisitions and cataloging areas.

The availability of 13 summer students on a full-time basis for two to three months in 1961 gave the Library staff a much needed boost. They worked diligently at their assignments and became in this brief period integral and enthusiastic members of the Library's operations.

Several members of the Library staff attended PHS orientation sessions and courses or seminars in management, languages, library science, documentation, and biomedical and scientific subjects given by NIH, the Civil Service Commission, Department of Agriculture, and local universities.

Major Problem Areas

Every activity of the Library must be further strengthened and expanded if the Branch is to meet the unique technical informational needs of a dynamic research organization like the National Institutes of Health. The existing manpower and literature resources will have to be upgraded so that the Library can supply the individual scientist with the literature he needs and assist him in researcher-to-researcher communication both nationally and internationally.

Long-term planning for the improvement and extension of library services must await the successful recruitment of a qualified candidate for the position of Chief, Library Branch. Among the problems facing the new Chief, for example, will be the great need for adequate space of the proper configuration; and the recruitment of top-level supervisory personnel, together with additional professional librarians, and several qualified subject matter specialists for reference and bibliographic work. Other matters calling for early and basic decisions by the Library's future supervisory staff have to do with the revision of the cataloging system, the location of literature in the stack areas, the volumes to be weeded from the collections, and means of meeting the ever-increasing demand for translating service.

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